for professional digital cinema and photography markets and initial developments in automotive computer vision and other applications.

9. Since 2012, I have been employed as a senior software engineer at Jump Trading, LLC, a proprietary trading firm with a focus on low latency algorithmic and high-frequency trading strategies. More specifically, my responsibilities include software optimization for high speed trading, computational data analytics, analysis of financial market data and feeds, trading infrastructure design, and vendor relationship building.

10. For my work on this reexamination matter, I am being compensated at a rate of $400/hour.

IV. LEVEL OF ORDINARY SKILL IN THE ART

11. I have been informed by counsel that a person of ordinary skill in the art (POSITA) for the invention claimed in the '551 Patent, would have had a Master's of Science Degree (or a similar technical Master's 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.

12. I agree with the above statement regarding the appropriate level of ordinary skill in the art for the '551 Patent. My opinion is based on my review of the patent, as well as my knowledge of the level of skill of individuals in this field. In forming my opinions, I have also considered the nature of problems that the '551 Patent was intended to solve, and the education level of active professionals in the field.

V. RELEVANT LEGAL STANDARD

13. I am not a lawyer and do not purport to offer legal opinions. In forming my opinions, however, I have been asked to apply certain standards regarding patentability that have been provided to me by counsel.

14. I understand that for purposes of this reexamination the terms in the claims of the '551 patent and the new claims as presented in this reexamination are to be given their broadest reasonable interpretation in light of the specification of the '551 Patent, as understood by one of ordinary skill in the art as of the earliest priority date of the '551 Patent.

15. It is my understanding that a claim is obvious if a reference alone or in combination with one or more prior art references discloses, expressly or inherently, every claim limitation so as to render the claim, as a whole, obvious. In determining whether or not a patented invention would have been obvious, the following factors should be considered: (a) the scope and content of the prior art; (b) the differences between the prior art and the claims at issue; (c) the level of ordinary skill in the art; and (d) any "secondary considerations" that may be present.

16. I understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art; however multiple prior art references or elements may, in some circumstances, be combined to render a patent claim obvious. I understand that I should consider whether there is an "apparent reason" to combine the prior art references or elements in the way the patent claims to protect against the distortion caused by hindsight. Along the same lines, I understand that the '551 Patent cannot be used as a blueprint to piece together the prior art in order to combine the right references in the right way to create the claimed invention. To determine whether such an "apparent reason" exists to combine the prior art references or elements in the way a patent claims, I understand that

it is often necessary to look to the interrelated teachings of multiple patents, to the effects of demands known to the design community or present in the marketplace, and to the background knowledge possessed by a person having ordinary skill in the art. In sum, I understand that obviousness requires the additional showing that a POSITA at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.

17. I also understand that when the prior art "teaches away" from combining prior art references or certain known elements, discovery of a successful means of combining them is less likely to be obvious. A prior art reference may be said to "teach away" from a patent when a POSITA, upon reading the reference, would be discouraged from following the path set out in the patent or would be led in a direction divergent from the path that was taken by the patent. Additionally, a prior art reference may "teach away" from a claimed invention when substituting an element within that prior art reference for a claim element would render the claimed invention inoperable.

18. I further understand that if a proposed modification or combination of prior art references would change the principle of operation of the prior art being modified, then the teachings of the references are not sufficient to render the claims obvious.

VI. CLAIM CONSTRUCTION

19. I understand that during a reexamination, the Patent and Trademark Office determines the scope of claims in patent applications by giving claims their broadest reasonable interpretation in light of the specification as it would be understood by one of ordinary skill in the art. I further understand that the broadest reasonable interpretation does not mean the broadest possible interpretation. Rather, the meaning given to a claim term must be consistent with the

usage of the term in the claims, the specification and drawings. Further, the broadest reasonable interpretation must be consistent with the interpretation that those skilled in the art would reach.

20. Consistent with the disclosure in the '551 Patent and usage of the term in the claims, a person of ordinary skill in the art would construe the term *light source* to mean "individual LED".[1] As the Detailed Description of the '551 Patent makes clear,

> **[t]he system is built around a 'digital' light source**. That is, the emanating lighting effect is **the sum of the characteristics of a multiplicity of discretely controllable 'digit' sources**. The difference between the **individual 'digit' light sources** and their summation manifests itself in the resultant light characteristic, be in its intensity, spatial intensity distribution, spectral energy content and spectral intensity distribution … Therefore, the illuminating device may be described as a **'digital' light source** or as a Multiple Solid-state Lighting Source (MSLS), comprising many 'digits', SLSs, and essentially replaces the lamp of present-day luminaries.

(Ex. PAT-A, '551 Patent at 16:39-17:2, emphasis added.)

The disclosure in the '551 Patent repeatedly and consistently describes the '551 invention as comprising a "digital" light source that provides "digital control," the "invention comprises 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. PAT-A, '551 Patent at 11:8-13, emphasis added.) A person of ordinary skill in the art understands that a solid-state light source (SLS) uses light-emitting diodes as a light source, rather than electrical filaments, plasma or gas.

[1] For ease of reference, all claim language will be italicized.

21. The '551 Patent goes on to explain how the "digital aspect" of the illuminating device gives rise to the desired "digital" "control capability":

> The multiple light sources of specific characteristics provide quanta of power and spectrum which are smoothly added or detracted to generate a changed lighting effect. The digital aspect arises from the sufficient progression of values, varying by minutes to produce a continuum so as to be non-discernable or irrelevant to the user. The **added controllability is realized by breaking up the light-production, into discrete, specifically aimable, and dimmable elements which can be addressed by control electronics** for the purpose of affecting the intensity, spectrum and spatial distribution of spectrum and of intensity of the illumination provided by the luminaire of the present invention.
>
> The overall combination of control capability and discrete light sources yields a digital lighting fixture. The 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**."

(Ex. PAT-A, '551 Patent at 2:51-3:3, emphasis added.)

22. The specification of the '551 Patent further states:

> **[t]he advance over prior art is a solid-state light source** with increased: 1. Efficiency—more effective lumen per watt electricity. 2. Durability—physical strength, life expectancy, lumen maintenance and spectral stability. 3. Lighting quality—as related to visual comfort and "atmosphere". 4. Functionality—**ability to control the light placement, intensity and color temperature and do so as needed.** 5. Energy savings 6. Lower overall lifecycle cost.

(*Id.* at 11:66-12:6, emphasis added.)

In reference to the control functionality, the specification of the '551 Patent states:

> **Integrating the light source with power conditioning electronics, control**

circuitry and sensors gives additional cost benefits and functionality including: 1. Mass production capability 2. Sealed-for-life fixture 3. Exact optical performance less spill light 4. Compact design 5. Feedback control and recalibrated color consistency over the device lifetime 6. Real-time lighting needs adaptability.

. . .

In summary, as opposed to **LED industry trends of going with a single large source, the present invention provides multiple smaller sized sources** of differing characteristics such that their combined effect is greater than that which could have been offered by sum of the individual parts operating separately. 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.**

...

Unique to this patent is the approach. It is the approach of a lighting manufacturer who provides lighting solutions versus that of a lamp manufacturer who produces a generic lamp

...

The process includes **determining: the correct lighting practice for the application; the surroundings; the selection and placement of light sources** and their integration with the mechanical support and; electronic control elements to realize the objective.

(*Id.* at 12:7-13, 24:37-47, 11:62-65, 13:63-65 emphasis added.)

Relatedly, the specification of the '551 Patent ties the control functionality to the ability to "adjust power to SLS":

In a preferred embodiment the DLF contains **logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and**

> **increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change**. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS.**

(*Id. at* 25:34-52, emphasis added.)

23. Finally, the Field of the Invention expressly **excludes traditional lighting sources**: "[t]he invention relates to multiple light source illuminating devices **intended to replace** incandescent, fluorescent and HID luminaires in general and specialty lighting applications."[2] (Ex. PAT-A, '551 Patent at 1:33-36, emphasis added.)

24. Notably, the laundry list of potential light sources listed at 16:47-51, is not applicable to the claimed *light source*, when read in the context of the overall specification and the usage of the term *light source* in the claims. By way of example, it wouldn't make sense to construe the term *light source* to include incandescent, fluorescent and HID light sources, as claim 1 would then be directed to *an illuminating device* with a "multiplicity of independently controllable" incandescent, fluorescent or HID light sources.

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[2] A person of ordinary skill in the art understands that HID is the abbreviation for high-intensity discharge (HID) lamps, which are a type of electrical gas-discharge lamp which produces light by means of an electric arc between tungsten electrodes housed inside a translucent or transparent fused quartz or fused alumina arc tube.

25. Accordingly, in view of the specification of the '551 Patent and the claim language, a person of ordinary skill in the art (POSITA) would construe the claim term *light source* to mean an individual LED.

VII. BACKGROUND OF AUTOMOTIVE LIGHTING INDUSTRY

26. As of 2001, researchers were developing technologies for continuously variable headlamps, able to change the intensity of light and/or the direction of light emitted by the headlamps. (Ex. PA-C, Stam '632 at 1:21-24.)

27. Per the '632 patent filed in April, 2000, the intensity of headlamp illumination could be "accomplished in several different" ways by: 1) providing "a pulse width modulated (PWM) signal to the headlamp and "varying the duty cycle of the headlamp power", 2) providing a "PWM signal to a lamp driver integrated circuit", 3) through high intensity discharge (HID) headlamps—" a new, highly efficient headlamp technology"—wherein "ballasts used to power HID lamps can be directly supplied with a control signal to vary headlamp illumination intensity"; and 4) providing "an attenuating filter to absorb some of the light emitted from the headlamp." (*Id.* at 1:26-48.)

28. In 2001, there were also several known means for changing the direction of light emitted from headlamps:

> Headlamp aim can be varied using actuators [such as stepper motors] to move the headlamp housing relative to the vehicle. . .For headlamps with appropriately designed reflectors, mechanically moving the light source relative to the reflector can change headlamp beam direction as well as headlamp illumination intensity. Additionally, with HID headlamps, the headlamp beam can be aimed by "deflecting or perturbing the arc in such a way as to vary the lamp output.

(*Id.* at 1:52-65.)

29. Industry experts were also interested in continuously variable headlamps:

> Automatic control of continuously variable headlamps offers several potential benefits over automatic control of traditional on-off headlamps. Greater flexibility for illumination is available, allowing headlamp illumination to be better adapted to driving conditions. Also, continuously varying the headlamp illumination does not create rapid changes in illumination that may startle the driver.

(*Id.* at 2:13-19.)

30. As set forth in the '632 patent, "one of the oldest methods [for a continuously variable headlamp] is to aim the headlamp in the same direction as steered wheels. Another method increases the illumination range in proportion to vehicle speed." (*Id.* at 2:22-24.)

31. "Still another method of controlling headlamps has been developed for HID lamps. The increased brightness and blueish color of the HID lamps is particularly disrupting to oncoming drivers. Due to this disruptness effect, certain European countries require headlamp leveling systems". (*Id.* at 2:25-29.)

32. However "[o]ne problem with current continuously variable headlamp control systems is the inability to consider oncoming or leading vehicles in determining the illumination range of the headlamps." (*Id.* at 2:35-38.) Prior art solutions to modify illumination in view of oncoming and leading vehicles suffered from several problems. In particular, prior art systems lacked "color discriminating capability" and thus prior art imaging systems were "incapable of accurately determining lateral and elevational locations of headlamps or tail lights at any distance." (*Id.* at 2:54-60.)

33. As a result, prior to July, 2002, several of my patent filings, e.g. US 09/800,460 filed in March, 2001, which issued as U.S. Patent No. 6,587,573 ("Stam '573") in July, 2003, focused on how to improve automatic high beam dimming functionality by improving image

detection capability using an image array sensor to 1) distinguish "nuisance" light sources, tail lights and oncoming lights to avoid unnecessary switching to low beams; and 2) develop a more intelligent set of automatic high beam controls of halogen/HID light sources based on the location of detected objects. (Ex. PA-D, Stam '573.)

34. The patent applications I filed during this time, for example the '573 patent and its related filings (''573 Family of Patents"), describe detailed methods for distinguishing "nuisance" light sources, such as reflectors, street signs, streetlights and house lights, from taillights and oncoming headlight sources using a coordinate-specific image array sensor and microprocessor that employs various algorithms using location, brightness and color information.

35. Relying on this image detection capability, control strategies were outlined to adjust the illumination to avoid glare based on the identification or type of detected objects by 1) turning them on/off or varying the intensity of the light sources and 2) changing the direction of the light sources using motors. By way of example, representative illumination patterns are shown in Figs. 50A-50C of U.S. Patent No. 6,587,573. (Ex. PA-D, Stam '573, Figs. 50A-50C.)

36. In the '573 Family of Patents, the auto high beam control teachings contemplated halogen or HID light sources as those technologies were proven and reliable at the time. While I was at Gentex, high-powered white light LED technology was still in a nascent stage, with LED experts working on improvements to lamp technology and the related supportive environment needed for LED applications. As we detailed in the '573 Family of Patents, LEDs suffered from several technical constraints at the time, with issues related to product variability, power restrictions, thermal load requirements, production of white light and lighting output.

37. Although LEDs were known to be more energy efficient, the technology was overly complex, unreliable and too costly for front headlights. As a result, in 2003 and for several years

thereafter, those skilled in the art of auto headlight design and controls used LEDs for taillights and interior spotlights but not front headlights. By way of example, see EP1391347, filed in 2003 by HELLA (a global developer and manufacturer of automotive lighting technology), is directed to a pivoting, auto high-beam lamp devoid of any teaching of the use of LEDs (Ex. OTH-G, Krukenbaum '347 patent) and U.S. Patent No. 6,752,523 filed in October, 2002 by Koito (a global developer and manufacturer of automotive lighting technology), which discloses the use of LEDs for taillights (Ex. OTH-H, Takahashi '523 patent).

38. LED headlights were first used in vehicles in 2007-2008. *See*, Toyota's use of a partial LED headlight in 2007 and Audi's introduction of full LED headlights in 2008. (Ex. 1, Motor Authority, Ex. 2, Audi Technology Portal.) *See*, Koito's development chronology, which lists "Production and sales of the world's first LED Headlamps" in May 2007; HELLA's product history timeline, which lists "HELLA develops the first full LED headlamp for the Cadillac Escalade Platinum" in 2008 and "First full LED headlamp with AFS functions Audi A8" in 2010. (Ex. 5, Koito, pg. 1; Ex. 6, HELLA, pg. 1.)

VIII. SUMMARY OF THE '551 PATENT

39. The '551 Patent, entitled "Detector Controlled Illuminating System," issued on April 24, 2018 to inventor Yechezkal Evan Spero and is unassigned. The application which led to the '551 Patent was filed on January 24, 2012, with a priority date of July 12, 2002. (Ex. PAT-A, '551 Patent.)

40. Per the Detailed Description, the '551 Patent introduced a system "built around a 'digital' light source":

> **The system is built around a "digital" light source**. That is, the emanating lighting effect is the sum of the characteristics of a multiplicity of discretely

controllable "digit" sources. The difference between the **individual 'digit' light sources** and their summation manifests itself in the resultant light characteristic, be in its intensity, spatial intensity distribution, spectral energy content and spectral intensity distribution. All of these characteristics are also variable with time.

(Ex. PAT-A, '551 Patent at 16:39-46, emphasis added.)

41. The '551 Patent discloses a myriad of flexible applications for this digital light source, centered around the "controllability offered by breaking the light output up into discrete specifically aimable and dimmable elements," which can be addressed by control electronics to effect intensity, spectrum and distribution." (*Id.* at 24:37-47.) For headlights, the disclosures identify yet another level of control: "[t]he flexible characteristics of the DLF [digital lighting fixture] allow for spatial variations of the intensity and spectral power distribution of the light over the area covered. When the element of variation of intensity and SPD [spectral power distribution] with time over the area covered is introduced another dimension of flexibility is introduced. These properties are unique to the DLF and allow them to deal with dynamic lighting situations in a way not afforded by prior-art lighting devices." (*Id.* at 57:24-37.)

42. The '551 Patent further explains how the "digital aspect" of the illuminating devices gives rise to "digital" "control capability" for individual LEDs or selectable groups of LEDs "which are smoothly added or detracted to generate a charged lighting effect":

> The multiple light sources of specific characteristics provide quanta of power and spectrum which are smoothly added or detracted to generate a changed lighting effect. The digital aspect arises from the sufficient progression of values, varying by minutes to produce a continuum so as to be non-discernable or irrelevant to the user. The added controllability is realized by **breaking up the light-production, into discrete, specifically aimable, and dimmable elements** which can be addressed by control electronics for the purpose of affecting the intensity, spectrum and spatial distribution of spectrum and of intensity of the illumination provided by

the luminaire of the present invention.

The overall combination of control capability and discrete light sources yields a digital lighting fixture. The 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.

(Ex. PAT-A, '551 Patent at 2:51-3:3, emphasis added.)

43. The '551 Patent also teaches how various applications can obtain a synergistic effect from the controllability offered by "discrete specifically aimable and dimmable elements" and image detection "devices capable of detection changes in the surrounding environment" "so as to provide the optimal lighting solution in real-time." (Ex. PAT-A, '551 Patent at 57:32-37.) By way of example, the '551 Patent discloses:

> Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today.

(*Id.* at 51:43-49.)

44. More particularly, the '551 Patent teaches how "[a]nalysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout." (*Id.* at 52:62-65.)

45. The '551 Patent further discloses glare-free adaptive driving beam systems: "[u]sing 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 [solid state light source, e.g. LED] to follow and illuminate distant overhead and roadside signs for a longer time, yet not blind oncoming traffic due to the narrow beam." (*Id.* at 52:62 – 53:4.)

These teachings are reflected in base claim 6 and the new claims. *See*, claim 6 and claims 24, 32 and 56 below, which are representative of the new claims. The full set of new claims can be found at Ex. OTH-C, New Claims.

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.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine first coordinates corresponding to an other vehicle, based on the coordinate-specific information;

select a cluster of the LEDs that emit light toward at least a portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates; and

change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least one target, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

create a beam of diminished illumination illuminating at least a portion of the at least one target with non-glaring illumination, created within a broader field of illumination having different intensity than the beam, by one or more changes to characteristics of first light of a cluster of the LEDs providing the first light directed at the at least a portion and creating the beam, the beam diminished in intensity relative to the broader field of illumination illuminating at least above and on both sides of the beam; and

follow, based at least in part on data from one or more of the cameras, the at least one target with the diminished illumination as the at least one target changes location relative to the motor vehicle.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least one other vehicle ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine, based on data from one or more of the sensors, a vertical and horizontal position associated with the at least one other vehicle;

select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and

reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative to intensity of illumination on both sides of the first area at elevations common with the first area illuminated by a second cluster of the LEDs, by control of emission from the first cluster.

IX. THE ASSERTED REFERENCES

A. STAM PCT

46. Filed on March 20, 2001, WO01/70538 ("Stam PCT") is directed to a system for controlling exterior vehicle lights, wherein the control system "comprises an imaging system configured to image the scene forward the controlled vehicle, and a control circuit for processing the image of the scene obtained from the imaging system and for controlling the exterior lights to change their beam pattern in response to objects detected in the processed scene." (Ex. PA-A, Stam PCT at 2-3.)

47. Per Stam PCT, the control circuit can turn the lights on/off or change brightness

and aim to produce beam patterns that avoid causing excessive glare:

> Ideally the exterior lights are controlled such that if an observer is located in a vehicle within a 'glare area' relative to the vehicle (i.e., the area in which the observer would perceive the brightness of the exterior lights as causing excessive glare), the beam illumination pattern is varied such that the observer is no longer in the glare area. The perceived brightness and/or glare area of the headlamps (and/or other exterior lights) may be varied by changing the illumination output of the one or more of the lights forming the headlamps, activating or deactivating some or all of the lights, altering the illumination pattern forward of the vehicle, or a combination of the above.

(*Id.* at p. 9.)

48. It should be noted that in the above portion of Stam PCT, activating or deactivating "some or all of the lights" refers to low beam, high beam or side bending lights, which is distinct from any teaching involving individual light emitters within a lamp.

49. Though the Stam PCT teachings are directed to halogen/HID light sources, it discloses two limited uses for LED applications. (*Id.* at 72-73.)

50. In view of the technical constraints that limited LED usage in headlights in 2001-2002, we limited our use of LEDs to two applications—headlamp steering and flashing:

> It has long been considered to be desirable to provide headlamps that can be steered in the direction that the vehicle is turning. It is also desirable to provide forward lighting that can be turned OFF, or substantially attenuated, for such a short period of time that the driver does not notice that the lights are OFF. In this way, reflections do not exist during image acquisition. Although a light emitting diode (LED) lamp can be used to provide these features in a cost-effective manner, LED lamps producing enough light to implement a vehicle headlamp are not commercially available. LEDs suffer from a number of disadvantages that limit their application in vehicle headlamps, not the least of which are the relatively small amounts of

> light produced by LEDs and manufacturability limitations when incorporating LEDS having exotic constructions. Because of these disadvantages, LED lamps have not been used to implement a vehicle headlamp despite the fact that LEDs are more rugged, more energy efficient, and significantly longer lasting than other light technologies. Additionally, means of producing white light from LEDS have only recently become practical as discussed in U.S. Patent No. 5,803,579, entitled ILLUMINATOR ASSEMBLY INCORPORATING LIGHT EMITTING DIODES, issued to John K. Roberts et al. on September 8, 1998.

(Ex. PA-A, Stam PCT at 72-73, emphasis added.)

51. As a result of these technical constraints, the Stam PCT disclosure is limited to two LED applications that could be used as a complement to and/or as a substitute for halogen/HID light sources, to address specific imaging challenges and improve auto high beam functionality. (*Id.* at 72-79.)

52. One of these LED applications focuses on the problem of flashing, which occurs when reflections off an object, such as a sign, are misinterpreted by the image sensor as an oncoming vehicle and trigger disruptive, rapid high/low beam flashing or cycling (repeatedly turning high beams on and off). As one solution for headlamp flashing, we contemplated the use of LEDs to rapidly reduce the light levels or turn the LEDs off, during an image-sampling interval, so that the reflections do not exist or interfere with image acquisition and processing. If done fast enough, the driver would not notice the change in light levels and the problem of flashing would be rectified. Such rapid reduction of intensity would be difficult or impossible with halogen/HID light sources. (*Id.* at 73-75.)

53. The second LED application focused on an improved way to "steer" the light source by replacing the halogen/HID light with an LED array that could be aimed at a fixed angle for auto high beam applications. To facilitate "steering" for auto high beam applications, we disclosed use

of an LED array to 1) help provide sufficient output light and 2) project light in more than one direction, *i.e.*, either horizontally (*see* Fig. 27) vertically (*see* Fig. 28) by providing a support member with two different angled orientations. In all cases, the LEDs in each array were connected together and operated by a single controller, such that the entire array would be on/off or dimmed, as shown in Fig. 26a. (*Id.* at 77-79.)

54. More specifically, in Fig. 26a, every optical radiation emitter (LED chip) 2603 is electrically connected together "to electrical conductor strip 2607 through a wire bond 2609 and a resistor 2611. Each of the emitters 2605 is connected to electrical conductor strip 2613 through a bonding wire 2615 and a resistor 2617." (*Id.* at 74.) Since electrical conductor strips 2607, 2613 are shown to be common to multiple LED chips, they necessarily are not individually controlled or controllable.

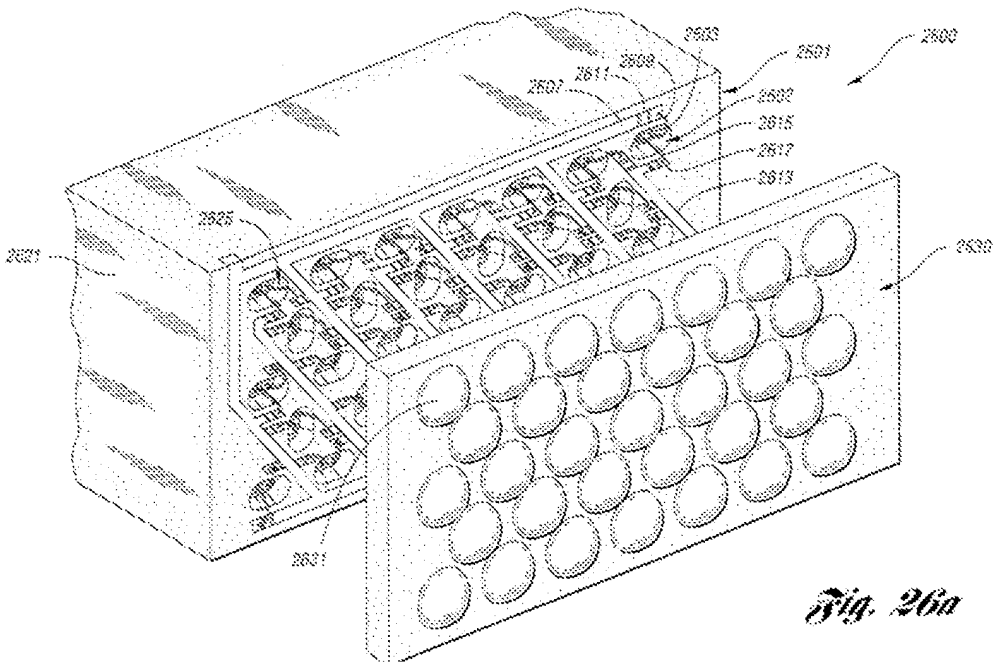


Fig. 26a

55. In Figs. 50a-50c, we illustrate the types of illumination beam patterns that can be produced from the disclosed auto high beam applications. In each case, the light source is treated

as a fixed block of light—whether halogen/HID or an LED array— that can be "steered" up/down or right/left, treating an array of LEDs as a unit that would be operated together.

56. Another headlamp configuration is depicted in Fig. 28, in which two LED arrays are provided, for low and high beams, and each array is treated as a single unit to be operated together:

> [a]nother alternative design for a headlamp for providing low and high beams is illustrated in Fig. 28. The headlamp 2800 includes a heat extraction member 2801 having two lamp sections 2803 and 2805. The heat extraction member 2801 is configured to include the two lamp sections 2803 and 2805, each of which is substantially identical to lamp 2601 [in Figs. 26a]. The heat extraction member provides two front faces at an angle of 1° to 2°, and may advantageously be angled at approximately 1.5°. The angle is exaggerated in Fig. 28 so that the angled surfaces are readily visible.

(*Id.* at 79, emphasis added.)

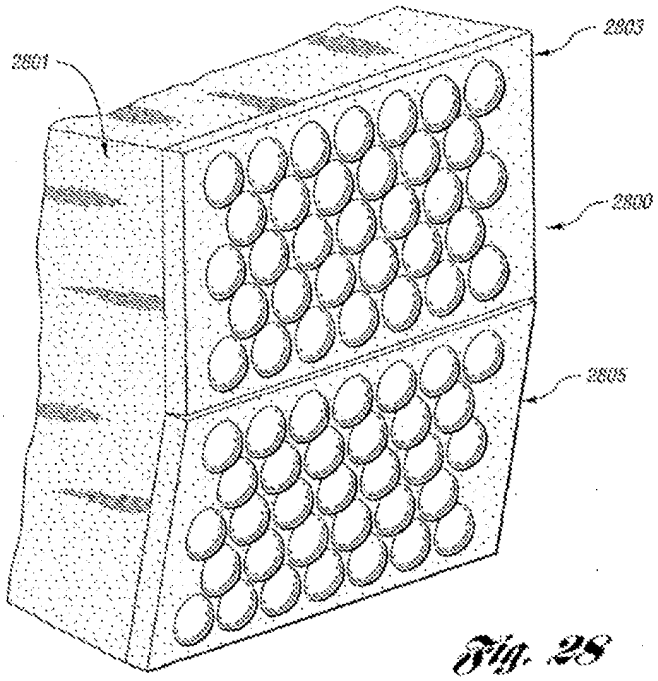


Fig. 28

57. In reference to Fig. 28 and the two separate LED lamp sections, 2803 and 2805 for

high and low beams, the specification states: "[b]y controlling the selection of the LEDs that are illuminated, the headlamps can be aimed." When read in context this sentence is consistent with the Stam PCT teaching that one or more LED arrays can be controlled as a single unit and in that capacity, the resulting beam formed by the headlamps can be steered and aimed.

58. In the '573 Family of Patents and Stam PCT, we did not disclose a digital headlamp that included individually controllable LEDs that could be controlled to illuminate a defined coordinate-specific region. Neither the '573 Family of Patents nor Stam PCT teach or suggest controlling the individual LED or a selectable group of LEDs within the array based on image detection at a given coordinate-specific location.

59. While the '573 Family of Patents and Stam PCT disclosed an improved continuously variable lighting system that could adjust the intensity of the high beams and aim the headlamp beam to avoid glaring an oncoming and/or preceding vehicle, in all cases, light was treated as a fixed block to be moved or adjusted in a particular direction or manner. As a result, the presence of one or more oncoming or preceding vehicles, would cause a driver's field of view to be lit primarily by the low beam lighting.

60. Additionally, neither the Stam PCT nor the '573 Family of Patents disclose use of a GPS or map data to generate coordinate-specific illumination patterns in response to upcoming road curvatures. We mention use of GPS embodiments to determine the location of the vehicle and whether the vehicle is on a residential, country or town street, to determine whether "super" high beams were appropriate. We also disclose "bending lights" in which the light source aim is varied horizontally or separate lamps are lit to provide better illumination when turning, which is detected based on vehicle steering. As with the other embodiments, we viewed each individual light source or an LED array as a single light source unit. We did not disclose individual control

of the LEDs within an array into individually controlled elements or clusters. As such, we did not disclose using image detection in combination with GPS and map data to generate illumination patterns formed by individual controlled LEDs or selectable clusters of LEDs within an array in response to upcoming road curvatures.

61. It was not until US Patent No. 6,861,809 which was filed on September 5, 2002 and published on June 12, 2003 that we first described the use of individually controllable LEDs where a portion of the LEDs within an array could be dimmed or turned off to avoid glaring an oncoming vehicle. (Ex. PA-E, Stam '809 patent.) *See* Fig. 7b and the accompanying description: "[a]lternatively, the window 700 may contain several independently controlled blocks 702 as shown in Fig. 7B. There may be any number of blocks, depending on the granularity of control that is desired. By selectively darkening these blocks, almost any desired beam pattern can be achieved." (*Id.* at 13:6-14:3, emphasis added.)

62. To the best of my recollection, no other companies were offering LED headlamp technology let alone contemplating this sort of LED-to-image correlation in 2003. Given the nascent state of LED technology, those in the field of automotive lighting, were not contemplating such LED applications at the time. As evidenced by two leading global headlamp suppliers, Koito and HELLA, per their websites, it wasn't until 2007 that the first LED headlamps were produced, and fully adaptive LED headlamps were not developed until 2010. *See*, Koito's development chronology, which lists "Production and sales of the world's first LED Headlamps" in May 2007; HELLA's product history timeline, which lists "HELLA develops the first full LED headlamp for the Cadillac Escalade Platinum" in 2008 and "First full LED headlamp with AFS functions Audi A8" in 2010. (Ex. 5, Koito, at 1; Ex. 6, HELLA, at 1.)

63. Prior to solving the issue of image detection, adaptive lighting technology that

correlated the LED controls to coordinate-specific image detection was not feasible.

B. HARBERS

64. U.S. Patent No. 6,406,172 ("Harbers") is directed to a headlamp and dynamic lighting system with a light source comprising a plurality of opto-electronic elements, preferably LEDs:

> The use of a plurality of opto-electronic elements with a relatively high luminous flux enables a vehicle headlamp to be manufactured having much more dynamic lighting possibilities than the known vehicle headlamp. The opto-electronic elements can be switched on and off, with the spatial distribution of the generated light beam depending on the conditions.

(Ex. PA-B, Harbers at 2:6-11.)

In Harbers, the spatial distribution of the light beam is adjustable based on predefined inputs:

> According to the invention, the spatial distribution of the light beam generated by the light source is continuously adjustable…Preferably, the spatial distribution is influenced by the speed of the vehicle, the rotational position of the steering wheel of the vehicle, the weather conditions, and it can also be influenced by the driver. Preferably, the spectral characteristics of the light beam generated by the light source depend on the position in the light beam. The light beam comprises at least two beam segments having essentially different spectral characteristics.

(Ex. PA-B, Harbers Abstract, numerical identifiers omitted.)

65. Though Harbers is continuously adjustable by the driver or in response to a specific set of defined inputs, Harbers doesn't disclose any sensor capable of detecting objects or targets in the illuminated area. Accordingly, while Harbers disclosed the use of LEDs in headlights, it failed to disclose use of any form of image detection and associated controls and thus did not teach adaptive lighting technology that correlated individual LED controls to image detection data.

66. Prior to the development of image detection systems--such as the kind disclosed in the '573 Family of Patents— headlamp systems employed auto high beam technology that generally relied on photodiode sensors, where any incident light would activate the photodiode sensors and cause the headlamp to unnecessarily switch from high beam to low beam. As pointed out in the '573 Family of Patents, the inability to discriminate between light sources minimized the effectiveness of prior art auto high beam technology. (Ex. PA-D, Stam '573 at 1:65 - 14:3.) Additionally, prior to the image detection systems disclosed in the '573 Family of Patents, continuously variable headlamps would aim the headlamp in the same direction as steered wheels and/or increase illumination range in proportion to vehicle speed, providing variability but not in reaction to the presence of oncoming or preceding vehicles. (Ex. PA-C, Stam '632 at 2:22-24.)

X. CLAIM 6 AND NEW CLAIMS 24-87 ARE PATENTABLE OVER THE COMBINATION OF STAM PCT AND HARBERS

A. THE STAM PCT AND HARBERS COMBINATION FAILS TO TEACH NUMEROUS LIMITATATIONS

67. As detailed below, Stam PCT and Harbers individually and on combination fail to teach many of the limitations of claim 6 and new claims 24-87.

68. Turning first to Stam PCT, while Stam PCT teaches the use of image detection and certain limited LED applications to address the problem of headlight glare, it fails to teach a headlamp with individually controllable LEDs and thus fails to teach the following limitations in claim 6 and by extension, new claims 24-87, as construed in Section VI above: 1) *electronic circuitry apparatus for the controlled powering of the* [individual LED] *light source*; and 2) *a controller ...in communication with the [individual LED] light source controlling power circuitry, arranged to processes* [*sic*] *the information communicated from the camera and automatically control the light provided to the illuminated area.*

69. In view of the known "disadvantages" with LEDs for vehicle headlamp applications, the disclosed LED headlamps in Stam PCT focus on two limited applications—headlamp flashing and headlamp steering.

70. Notably, Stam PCT lists the disadvantages that limit use of LEDs in vehicle headlamps, to explain why "LED lamps have not been used to implement a vehicle headlamp":

> LEDs suffer from a number of disadvantages that limit their application in vehicle headlamps, not the least of which are [1] the relatively small amounts of light produced by LEDs and [2] manufacturability limitations when incorporating LEDS having exotic constructions. **Because of these disadvantages, LED lamps have not been used to implement a vehicle headlamp**. . . Additionally, means of producing white light from LEDS have only recently become practical.

(Ex. PA-A, Stam PCT at 74, emphasis added.)

71. As a result, as detailed in paragraph 52 of this declaration, the disclosed embodiments used LEDs as a complement to and/or as a substitute for halogen/HID light sources, to improve auto high beam functionality. Similar to the halogen/HID light source embodiments, the LED embodiments in Stam PCT treated light as a fixed block to be moved or adjusted in a particular direction or manner—leaving a section of the driver's field of view to be lit primarily by low beam lighting.

72. In all LED embodiments, as depicted in Fig. 26a, the LEDs, in a given array were connected together [see 2615] and operated by a single controller, such that the entire array would be on/off or dimmed. (Ex. PA-A, Stam PCT at 140.)

73. More specifically, in Fig. 26a, every optical radiation emitter (LED chip) 2603 is electrically connected together "to electrical conductor strip 2607 through a wire bond 2609 and a resistor 2611. Each of the emitters 2605 is connected to electrical conductor strip 2613 through a

bonding wire 2615 and a resistor 2617." (*Id.* at p.74.) Since electrical conductor strips 2607, 2613 are shown to be common to multiple LED chips, they are thus not individually controlled or capable of facilitating control to selectable groups of LED chips.

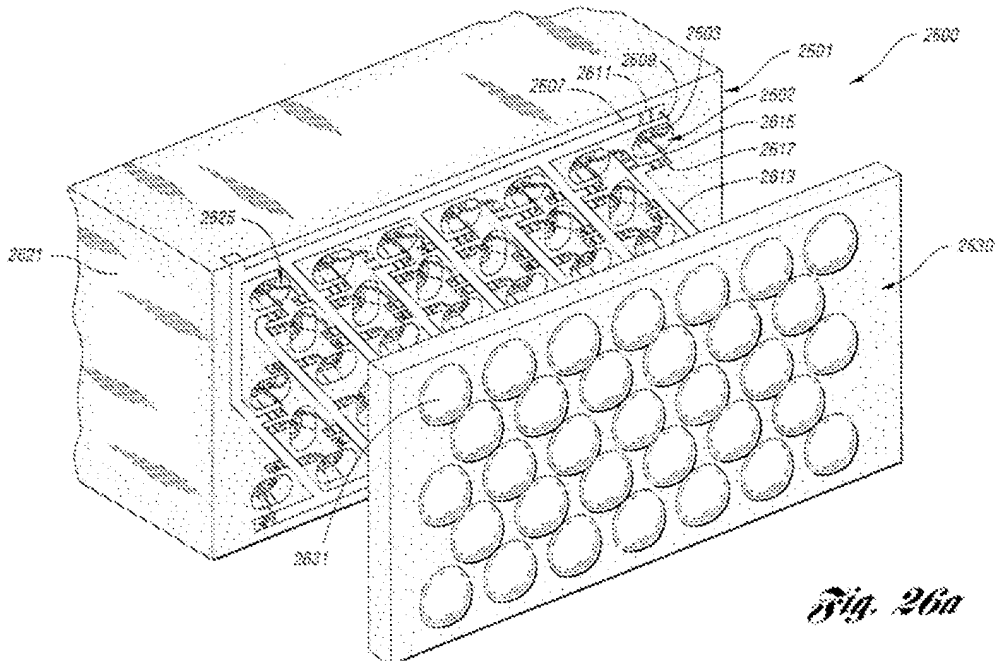


Fig. 26a

74. To clarify, in one section, the specification discloses the use of separate color emitters, for the purpose of creating white light and thus requires separate supplies for the different color emitters, but does not teach the ability to individually control an LED chip or selectable clusters of LED chips: "The circuit traces disclosed in Fig. 26a illustrate a pattern that may be used where separate supply is provided for the different emitters." (*Id.* at p.77.)

75. While Stam PCT can provide controlled powering to the LED array as a single fixed unit—such that the entire array can be on/off or dimmed—it is incapable of providing *controlled powering* to individual LEDs. Thus, under the proper construction of *light source* detailed in Section VI, it fails to provide *electronic circuitry apparatus for the controlled powering of the* [individual LED] *light source*—a limitation in claim 6 and all new claims.

76. Additionally, because there is no mechanism for controlled powering of individual LEDs, the controller cannot be *in communication with the* [individual LED] *light source controlling power circuitry*, as required by claim 6. Finally, because the LED embodiments in Stam PCT are treated as a fixed block to be moved or adjusted in a particular direction or manner, the controller is incapable of *being arranged to processes* [*sic*] *the* [coordinate specific] *information communicated from the camera and automatically control the light provided to the illuminated area.*

77. Stam PCT also fails to correlate individual LED controls to sensor data to diminish/enhance illumination at a coordinate-specific region, to provide optimized and non-glaring illumination in the presence of an oncoming or preceding vehicle. (Ex. PA-A, Stam PCT.)

78. As a result, Stam PCT does not teach or suggest controlling an individual LED or group of LEDs within an array, responsive to coordinate-specific image detection data, so that the controller 1) per claim 6, is *arranged to processes* [*sic*] *the* [coordinate-specific] *information communicated from the camera and automatically control the light provided to the illuminated area*; 2) per new claim 24 can *change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle;* 2) per new claim 32, *follow, based at least in part on data from one or more of the cameras, the at least one target with the diminished illumination as the at least one target changes location relative to the motor vehicle;* and 3) per new claim 56, *select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative to*

intensity of illumination on both sides of the first area at elevations common with the first area illuminated by a second cluster of the LEDs, by control of emission from the first cluster. (Ex. OTH-F, Side by side comparison.)

79. Simply put, Stam PCT fails to optimize lighting patterns to match the particular road scene. By treating light as a fixed block, in the presence of objects/targets, high beams—which output significantly brighter light and enhance safety— are shifted away from the road scene rather than individually controlled at a coordinate-specific level to provide optimized, non-glaring lighting patterns.

80. Accordingly, Stam PCT fails to teach the following limitations in base claim 6 and by extension, claims 24-87: 1) a headlamp with *electronic circuity apparatus for the controlled powering of the light source and other illuminating device elements* and 2) a controller *in communication with the light source controlling power circuitry,* that a) per claim 6 is *arranged to processes [sic] the information communicated from the camera and automatically control the light provided to the illuminated area*; b) per representative claim 56, can be controlled to illuminate a coordinate-specific area based on *known aimings of LEDs*; c) per representative claim 24 can *emit light toward at least a portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates*; and d) per representative claim 32 *follow, based at least in part on data from one or more of the cameras, the at least one target. See,* Ex. OTH-F which provides each of the reexamination independent claims side-by-side, to highlight the missing limitations in all claims. (Ex. OTH-F, Side by side comparison.)

81. Turning next to Harbers, though Harbers teaches that "spatial distribution of the light beam generated by the light source is continuously adjustable" by opto-electronic elements and thus discloses the *electronic circuitry apparatus for the controlled powering of the light source*

limitation, the combination of the '538 PCT and Harbers fails to teach many of the limitations of claim 6 and the new claims. (Ex. PA-B, Harbers.)

82. While the opto-electronic elements in Harbers are continuously adjustable by the driver or in response to a specific set of defined inputs, Harbers doesn't disclose any sensor capable of detecting objects or targets in the illuminated area, or per claim 6, a camera *for detecting coordinate-specific information about the illuminated area, said camera in communication with power and device control elements*. (Ex. PA-B, Harbers.)

83. Although Harbers discloses "ordering, providing and selectively switching on and off opto-electronic elements…in the form of an array" in response to the velocity of the vehicle, rotational position of the steering wheel, bad weather or in dimly-lit areas (*Id.* at 7:11-22), it fails to correlate individual LED controls to coordinate-specific camera/sensor data, as required by claims 6 and 24-87 and thus fails to disclose a digital headlamp that utilizes an adaptive driving beam to address glare. (Ex. OTH-C, New Claims.)

84. More specifically, in reference to claim 6, Harbers fails to disclose *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; and 2)* Harbers fails to teach a control strategy that correlates the coordinate-specific information from the camera, and controlled powering of the light source, wherein the controller *in communication with the light source controlling power circuitry,* is *arranged to processes* [*sic*] *the information communicated from the camera and automatically control the light provided to the illuminated area.* (Ex. PA-B, Harbers.) Harbers likewise fails to provide any of the following limitations, in all new claim sets[3]: 1) sensors for detecting coordinate-specific information-- *one or more sensors,*

[3] A claim set is an independent claim and the claims that depend from that independent claim.

including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area; 2) controllers processing the sensor data- *a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area;* 3) controlling an individual LED or group of LEDs within an array, responsive to coordinate-specific image detection data based on known aimings or coordinates of those LEDs, for example, per claim 48: *illuminate a portion of at least one object, indicated by data from at least one of the one or more sensors, by selecting a first cluster of the LEDs to emit first light directed towards a first area including the at least the portion of at least one object, the first area determined based at least in part on the data, the first cluster selected based at least in part on known aimings of light associated with the first cluster determined to correspond to the first area*; and 4) a control strategy that correlates LED controls to coordinate-specific sensor data of an object, to optimize illumination in a glare-free manner, for example as reflected in *claim 24*: *change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle.* (Ex. OTH-F, Side by side comparison.)

85. Stam PCT likewise fails to teach the last two limitations identified in paragraph 84, namely controlling individual LEDs responsive to coordinate-specific image detection data, based on known aimings or coordinates of those LEDs and a control strategy that correlates individual LED controls to coordinate-specific sensor data of an object/target to diminish/enhance illumination of a coordinate-specific region.

86. As a result, it is my opinion that each reference is missing numerous features of the new reexamination claims and even if combined, the combination of Stam PCT and Harbers taken as a whole fails to teach or suggest a headlamp that correlates LED controls to coordinate specific sensor data of a target to diminish/enhance illumination at a coordinate-specific region.

87. Taken together, Stam PCT and Harbers provide no teachings on methods to optimize illumination—for example, high beams, which output significantly brighter light and enhance safety—in the presence of objects or upcoming curvatures in the road.

88. More specifically, in reference to exemplary claims 6, 24, 32 and 56, the combination of Stam PCT and Harbers, taken as a whole fails to teach or suggest, *inter alia*, controlling an individual LED or group of LEDs within an array, responsive to coordinate-specific image detection data, so that the controller 1) per claim 6, *in communication with the light source controlling power circuitry*, is *arranged to processes* [*sp*] *the information from the camera and automatically control the light provided to the illuminated area*; 2) per new claim 24, can *change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle;* 3) per new claim 32, *create a beam of diminished illumination illuminating at least a portion of the at least one target with non-glaring illumination, having different intensity than the beam, by one or more changes to characteristics of first light of a cluster of the LEDs providing the first light directed at the at least a portion and creating the beam, the beam diminished in intensity relative to the broader field of illumination illuminating at least above and on both sides of the beam; and follow, based at least in part on data from one or more of the cameras, the at least one target with the diminished illumination as the at least one target changes location relative to the motor vehicle;* and 4) per

new claim 56, *select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative to intensity of illumination on both sides of the first area at elevations common with the first area illuminated by a second cluster of the LEDs, by control of emission from the first cluster*. (Ex. OTH-F, Side by side comparison.)

89. Additionally, I understand that to safeguard against hindsight reasoning, there must be an actual reason why a skilled artisan would have combined the elements in the manner claimed. I further understand that using an applicant's disclosure as a blueprint to reconstruct the claimed invention from isolated pieces of the prior art is impermissible, and that obviousness is to be judged at the point in time when the invention was made.

B. NO MOTIVATION TO COMBINE

90. In this case, there is no motivation to combine the asserted references because the combination of Stam PCT and Harbers changes the principle of operation of Harbers, which provides lighting that is more dynamic but limited to defined vehicle inputs such as vehicle speed or steering wheel position and/or manual adjustments. Harbers does not provide any set of operations that include a controller operating with sensor data, e.g. camera data, to automatically control the light based on inputs of objects/targets in the illuminated area. Any hypothetical combination of the teachings of Stam PCT and Harbers would require a substantial reconstruction and redesign of the elements shown in Harbers as well as a fundamental change in its basic principles of operation.

91. Notably, in 2000, when Harbers was filed, although camera-based image detection systems were disclosed, Harbers did not describe or suggest that their system did or could include

any such LED-to-image detection correlation. Moreover, while the problem of headlamp glare was well known in 2000, the Harbers system is not directed to that problem. Accordingly, any combination of Stam PCT and Harbers, requires that the principle of operation in Harbers undergo a substantial change. For these reasons, absent hindsight bias, a POSITA in 2002 would have no motivation to combine Stam PCT and Harbers.

C. TEACHING AWAY

92. Further, I understand that to avoid the strong potential for hindsight bias, the doctrine of teaching away requires that patent references should be reviewed as a whole and statements that teach away from a specific usage must be considered as part of an obviousness analysis.

93. Per Stam PCT,

> **LEDs suffer from a number of disadvantages that limit their application in vehicle headlamps**, not the least of which are [1] the relatively small amounts of light produced by LEDs and [2] manufacturability limitations when incorporating LEDS having exotic constructions. **Because of these disadvantages, LED lamps have not been used to implement a vehicle headlamp**. . . Additionally, means of producing white light from LEDS have only recently become practical.

(Ex. PA-A, Stam PCT at 74, emphasis added.)

94. It is my opinion that given the clear statements in Stam PCT regarding the constraints and technical issues surrounding use of LEDs for headlights, during the 2002-2003 time frame, a POSITA would be discouraged from using individually controlled LEDs or otherwise expanding usage of LEDs in headlights beyond the two limited applications of LED arrays expressly disclosed, particularly in the direction taken by the claims, for example in claim 56, where the illumination of an area or object/target is changed responsive to data from the

camera/sensors by *selecting a cluster of individual LEDs* within an array based on *known aimings* of the LEDs, to enhance/diminish illumination of an object/target relative to other coordinate-specific regions in the illuminated area.

D. CONTEMPORANEOUS FILINGS ESTABLISH POSITA MINDSET

95. Moreover, as evidenced by contemporaneous prior art filings, those skilled in the art of auto headlight design in 2002, needed to rely on proven technologies—e.g. halogen and xenon applications. LED technology was not viewed as suitable for headlamp applications.

96. From 2000-2003, it was well known that Gentex was a leader in LED lighting products and image sensing products. While the two product teams and technical disciplines were, as a matter of course, separate and distinct, a working relationship between team members forged a unique opportunity for interdisciplinary engagement and collaboration. This interdisciplinary engagement gave rise to the first family of patents—the '573 Family of Patents—where image detection technology was merged with LED technology for headlight applications. It bears emphasis that in 2002-2003, the field of LEDs and image detection were emerging technologies, each under development for distinct product offerings. To my knowledge, prior to the advent of the '573 Family of Patents, these technology disciplines were wholly distinct. Thus, it would not have been obvious for a POSITA in 2002-2003 to combine coordinate-specific image detection technology with any LED functionality, let alone a digital headlight that for example, per new claim 24, *determine first coordinates corresponding to an other vehicle, based on the coordinate-specific information; select a cluster of the LEDs that emit light toward at least a portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates; and change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination*

illuminating past the other vehicle while preventing glare to a driver of the other vehicle.

97. In sum, it is my opinion that a POSITA during the 2002-2003 timeframe would lack motivation to combine teachings from Stam PCT and Harbers in the manner claimed, for the following reasons: 1) Stam PCT teaches away from use of individually controlled LEDs as recited in the claimed invention; 2) any hypothetical combination is inconsistent with the principle of operation of Harbers and thus a by-product of hindsight bias; and 3) during the relevant time, the evolving fields of LED technology and image detection were wholly separate fields.

XI. OBJECTIVE EVIDENCE OF NONOBVIOUSNESS

98. I understand that objective evidence, including for example evidence of teaching away, industry praise, failure of others and long felt but unmet need, is relevant to whether a claim is nonobvious. Below are my opinions concerning specific objective evidence that shows in the form of long felt, but unmet need and industry praise, that further bolsters the patentability of the claimed invention--providing objective evidence that the glare-free adaptive driving beam technology claimed in the '551 Patent is nonobvious over the asserted references.

A. INDUSTRY PRAISE FOR THE GLARE-FREE ADAPTIVE DRIVING BEAM TECHNOLOGY OF THE REEXAMINATION CLAIMS

99. Over the years, numerous industry organizations, such as NHTSA, AAA and IIHS, industry publications, such as AutoWeek and Driving Vision News, and Automotive Industry Awards such as the PACE Award conferred by Automotive News have provided industry praise for the glare-free adaptive driving beam technology covered in the reexamination claims. A few recent examples of such industry praise, correlated to the 2018 lead up to the proposed NHTSA amendments, are provided below.

100. In a 2019 report AAA stated:

> Increasing roadway lighting without creating glare for other motorists should increase the safety of nighttime driving. This is the promise of adaptive driving beam headlamp technologies. NHTSA describes adaptive driving beam ["ADB"] as, "a type of adaptive front-lighting system that automatically enables upper beam headlamps and adapts their beam patterns to create a shaded area around oncoming and preceding vehicles to improve long-range visibility for the driver without causing discomfort, distraction, or glare to other road users.

(Ex. 8, AAA 2019 report at 3, emphasis added.)

101. The 2019 AAA report further stated:

> Auto-dimming systems (and manual high-low beam switching) are inherently limited. These systems must switch to low beam in the presence of traffic, resulting in a sharp reduction in roadway lighting. All headlamp systems which are limited to either high or low beam operation cannot avoid causing glare to other vehicles when driving on undulating roadways and cresting hills. ADB headlamp systems, with selective activation or shading of specific elements of the headlight beam, hold the promise to successfully address this major shortcoming of all current headlamp systems.

(Ex. 8, AAA, 2019 report at 56, emphasis added.)

102. An April 14, 2021 article by AutoWeek explains the problem with prior automatic high-beam systems and praises the ADB technology solution:

> [e]xisting automatic high-beam headlight systems are great, but there are limitations to what they can do. If you're driving in a suburban area with traffic and streetlights, they can become confused and leave the bright beams on when they shouldn't, or in some cases they can end up switching between low and high beam lights rapidly, which is both annoying and bad for visibility. Smart headlights help alleviate these problems by reading the road and surrounding conditions and applying light only where it is needed. Instead of the need to switch between two

> brightness settings, adaptive headlights' brightness and shape change in response to surrounding conditions. Where some automatic high beam systems become confused between streetlights and oncoming headlights and switch off when they shouldn't, smart headlights' advanced sensors and detection systems will eliminate the errant shifts in brightness.

(Ex. 7, Autoweek at 3, emphasis added.)

103. The Autoweek article goes on to establish the unmet need and praises ADB technology:

> It's no secret that the headlights on new cars are getting brighter. Now, even low beam headlights can be distracting to other drivers and pedestrians. Because adaptive headlights keep the bright lights off of pedestrians and other drivers, it's easier for people walking to stay out of the way and for other drivers to see where they're going. If there's an oncoming vehicle, the beam is partially blocked or turned off so that the other driver isn't blinded, but the rest of the road remains illuminated by bright light, which greatly improves their visibility without drastically reducing yours.

(Ex. 7, Autoweek at 4, emphasis added.)

104. Similarly, Driving Vision News states: "The benefit of a glare-free function is not only to shadow out other cars but also to provide further visibility for upcoming curves and dangerous situations; there is a clear safety gain by illuminating this curve in front of the driver." (Ex. 9, Driving Vision News at 1, emphasis added.)

105. It is my understanding that evidence of industry praise of a claimed invention that embodies the patent claims weighs in favor of a finding of nonobviousness.

106. I further understand that there must be a nexus between the industry praise and the claimed invention. To that end, a few exemplary publications providing industry praise for ADB technology, are outlined side-by-side with exemplary reexamination claims and support from the

'551 Patent specification for these claims, to establish nexus between the industry praise and the reexamination claims. *See*, Ex. OTH-E, '551 Industry praise nexus support document. The right-hand column includes an explanation as to how a person of skill in the art would understand the praise verbiage.

107. Below, by way of example, I have correlated each limitation of claim 24 with the industry praise verbiage and an explanation of the nexus between the two. The rationale articulated with respect to claim 24 applies to all similar limitations in claim 6 and the new reexamination claims. *See,* Ex. OTH-F, Side by side comparison.

108. In this paragraph I will review the nexus between the preamble in claim 24, *[a]n illuminating device having automatic control of the light provided to an illuminated area comprising*, and the praise verbiage from the PACE Award Automotive News article which provides: HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers" (Ex. 10, PR Newswire at 1.) It is my opinion that, from the described functionality, it's clear to a person skilled in the art that the praise is directed to an *illuminating device* as laid out in the preamble. *See*, Ex. OTH-E, '551 Industry praise nexus support document, at 1, 10, 27 and 45.

109. This paragraph addresses the limitation in claim 24, *a structure for incorporating illuminating device element* and the praise verbiage from the PACE Award Automotive News article provides: "The system automatically adjusts **a car's headlamps** to deliver 'glare free' illumination, dimming or switching on and off light sources based on traffic conditions." (Ex. 10, PR Newswire at 1.) It is my opinion that, from the described functionality, it's clear to a person

skilled in the art that the praise is directed to *a structure for incorporating illuminating device elements.* *See*, Ex. OTH-E, '551 Industry praise nexus support document, at 1, 11, 27 and 45.

110. In this paragraph I will review the nexus between the limitation *a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source* and the praise verbiage from the PACE Award Automotive News article provides: HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10, PR Newswire at 1.) It is my opinion that, from the described functionality, a person skilled in the art would readily understand that such an automatically adjustable system would include individually controllable LEDs in communication with a power source. *See*, Ex. OTH-E, '551 Industry praise nexus support document, at 5, 14, 30-31, 48.

111. This paragraph addresses the limitation in claim 24, *electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements* and the praise verbiage from the PACE Award Automotive News article which provides:

> HELLA . . . has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers. The system automatically adjusts **a car's headlamps** to deliver 'glare free' illumination, dimming or switching on and off light sources based on traffic conditions.

(Ex. 10, PR Newswire at 1, emphasis added; Ex. OTH-E, '551 Industry praise nexus support document.)

It is my opinion that, from the described functionality, it's clear that the praise is directed to an illuminating device, including *electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements*. (*See,* Ex. OTH-E, '551 Industry praise nexus support document, at 7, 16, 33 and 51).

112. This paragraph addresses the limitation in claim 24, *one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors* and the praise verbiage from the PACE Award Automotive News article: "The **new Matrix Beam system combines a front camera**, high-performance software and "intelligent lighting" technology **to recognize cars that are being followed as well as oncoming traffic**." (Ex. 10, PR Newswire at 1, emphasis added). It is my opinion that, from this sentence, it's clear to a person skilled in the art that the industry praise is directed to an illuminating device that includes the details of the camera sensor limitation. (*See,* Ex. OTH-E, '551 Industry praise nexus support document, at 8, 17, 34, and 52.)

113. This paragraph addresses the limitation in claim 24, *a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area* and the praise verbiage from the PACE Award Automotive News article which provides:

> A leader in automotive lighting and electronics, HELLA's "glare-free high-beam" headlights **use individually controlled LEDs that adjust automatically to real-time traffic conditions** to reduce glare for other drivers. **The new Matrix Beam system combines a front camera, high-performance software and "intelligent**

lighting" technology to recognize cars that are being followed as well as oncoming traffic.

The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions.

(Ex. 10, PR Newswire at 1, emphasis added.)

It is my opinion that, from the above sentences and the inherent knowledge possessed by a person skilled in the art, it's clear that the industry praise is directed to an illuminating device that includes the details of the controller limitation, wherein the controller processes information from the camera. (*See,* Ex. OTH-E, '551 Industry praise nexus support document, at 9-10, 18-19, 35-36, 53-54.)

114. This paragraph addresses the limitation in claim 24, *memory storing instructions that, when executed by one or more processors of the controller, enable the controller to,* and the praise verbiage from the PACE Award Automotive News article which provides:

> A leader in automotive lighting and electronics, HELLA's "glare-free high-beam" headlights **use individually controlled LEDs that adjust automatically to real-time traffic conditions** to reduce glare for other drivers. **The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic.**
>
> **The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions.**

(Ex. 10, PR Newswire at 1, emphasis added.)

It is my opinion that, from the above sentences and the inherent knowledge of a person skilled in

the art, in order to implement the "high performance software" it's clear that *memory storing instructions*" would necessarily be provided. (*See,* Ex. OTH-E, '551 Industry praise nexus support document, at 20, 36-37, and 54-55.)

115. This paragraph addresses the limitation in claim 24, *enable the controller to . . determine first coordinates corresponding to an other vehicle, based on the coordinate-specific information* and the praise verbiage from the PACE Award Automotive News article which provides:

> A leader in automotive lighting and electronics, HELLA's "glare-free high-beam" headlights **use individually controlled LEDs that adjust automatically to real-time traffic conditions** to reduce glare for other drivers. **The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic.**
>
> **The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions.**

(Ex. 10, PR Newswire at 1, emphasis added.)

It is my opinion that, from the above sentences and the inherent knowledge of a person skilled in the art, it's clear that the industry praise is directed to an illuminating device that determines the position of at least one other vehicle. (*See,* Ex. OTH-E, '551 Industry praise nexus support document, at 20-21, 42, and 55-56.)

116. This paragraph addresses the limitation in claim 24, *enable the controller to . . . select a cluster of the LEDs that emit light toward at least a portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates*; and the praise verbiage

from the PACE Award Automotive News article:

> The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic.
>
> The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions.
>
> **Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience**.

(Ex. 10, PR Newswire at 1, emphasis added.)

It is my opinion that, from the above sentences and the inherent knowledge of a person skilled in the art, an illuminating device that includes "individually controlled LEDs" necessarily selects the LEDS to be aimed based on the position of the detected vehicle, per the *select a cluster* limitation. (*See,* Ex. OTH-E, '551 Industry praise nexus support document, at 22-23 and 56-57.)

117. This paragraph addresses the limitation in claim 24, *enable the controller to . . . change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle* and the praise verbiage from the PACE Award Automotive News article which provides:

> The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic.
>
> The system automatically adjusts a car's headlamps to deliver "glare free"

illumination, dimming or switching on and off light sources based on traffic conditions.

Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.

(Ex. 10, PR Newswire at 1, emphasis added.)

It is my opinion that, from the above sentences it would be clear to a person skilled in the art that the industry praise description of an illuminating device with "two or more dark zones with 'light-in-between" to maximize visibility, corresponds to the above-identified claim limitation, providing reduced illumination in the dark zones relative to the illumination on both sides of the dark zone. (*See,* Ex. OTH-E, '551 Industry praise nexus support document, at 24-25, 42, and 61-62.)

118. As detailed with respect to representative claim 24 above and representative claims 6, 24, 32 and 56 in Ex. OTH-E, '551 Industry praise nexus support document, the objective evidence of industry praise and the nexus to the reexamination claims supports my underlying conclusion that the reexamination claims are nonobvious over the combination of Stam PCT and Harbers and are thus patentable. (*See,* Ex. OTH-E, '551 Industry praise nexus support document.)

B. LONG FELT BUT UNMET NEED

119. Automotive companies and the industry at large have long recognized the two-fold need for 1) increased visibility at night and 2) avoiding the discomfort of glaring headlamps.

120. This two-fold need was first solved by the glare-free adaptive driving beam systems described by Spero in the '551 Patent, which gave rise to claim 6 and the new reexamination claims, supported by the 2002 provisional application filing by Spero.

121. As evidenced by contemporaneous prior art filings in 2002-2003, LED technology

was in nascent stages and not viewed as suitable for headlamp applications. In 2003 and for several years thereafter, those skilled in the art of auto headlight design and controls used LEDs for taillights and interior spotlights but not front headlights. By way of example, see EP1391347, filed by HELLA in July, 2003 which is directed to a pivoting, auto high-beam lamp devoid of any teaching of the use of LEDs and U.S. Patent No. 6,752,523 filed in October, 2002 by Koito, which discloses the use of LEDs for taillights but not headlights. It was not until 2006-2009 that automotive lighting companies began filing patents directed to digital headlights for adaptive driving beam technology. (*See*, Ex. OTH-G, Krukenbaum '347 patent and Ex. OTH-H, Takahashi '523 patent.) Notably, LED headlights were first used in vehicles in 2007-2008. *See*, Toyota's use of a partial LED headlight in 2007 and Audi's introduction of full LED headlights in 2008, (Ex.1, Motor Authority; Ex.2, Audi technology portal).

122. Regulatory restrictions by the National Highway Traffic Safety Administration (NHTSA) have prevented adaptive driving beam technology from activation in the US, though such technology has been employed outside the US for years. For a period of several years, starting in 2013, OEMs petitioned NHTSA for a change in regulations. In 2018, NHTSA announced proposed rules to amend the regulations to allow adaptive driving beam (ADB) technology. (Ex. 4, NHTSA Proposed Rule 2018, at 1.) In July 2020, Alliance for Automotive Innovation ("Auto Innovators") consisting of 37 OEMs and "value chain partners" provided supplemental comments to the NHTSA notice of proposed rulemaking detailing their position on the proposed rulemaking. (Ex. 11, Alliance for Automotive Innovation at 1.)

123. The supplemental comment filed by the Alliance for Automotive Innovation, makes a compelling case for why the prior art auto-high beam applications did not satisfy the long-felt need for "adaptive driving beam technology," which refers to adaptive LED headlights that

address high beam glare through coordinate-specific control strategies (Ex. 11, Alliance for Automotive Innovation). By way of example, the Alliance for Automotive Innovation, which includes the majority of the global auto industry, acknowledged that "an average of 0.3% of nighttime fatal crashes list glare as a contributing factor, alternatively data shows that over 70% of pedestrian fatalities have occurred at night. IIHS "found that between 2009 and 2016, pedestrian deaths in dark conditions increased 56%." (*Id.* at 8, emphasis added.) In response to these reports, the supplemental comments filed by the Alliance, concludes "improved visibility benefits of ADB systems can help to decrease fatalities and injuries associated with these crashed. The increased illumination from ADB systems can contribute to considerably improving a driver's ability to identify obstacles or pedestrians on and off the roadway." Finally, the supplemental comments state, "IIHS has studied headlamp performance and real-world implications . . . IIHS found that, "The lower beams of many headlight systems with poor ratings don't provide enough light for a driver going 55 mph on a straight road to stop in time after spotting an obstacle in his or her lane." (*Id.* at 11.)

124. One industry publication from 2014, underscores the longfelt, but unmet need for a glare-free headlight that optimizes illumination: "[e]ven after 130 years of headlight development, more than half of vehicle crashes and fatalities occur at night despite significantly less traffic. More than 300,000 crashes and thousands of fatalities are caused by rain and snow at night annually. Approximately 30% of drivers are stressed by glare causing hundreds of fatalities every year." (Ex. 3, Tamburo R. et al. (2014) at 1-2, emphasis added.)

125. According to AAA, vehicle headlamps are a primary safety system:

> Research data from the National Highway Traffic Safety Administration (NHTSA) reports **approximately 25 percent of automotive travel occurs at night. However, nearly 52 percent of all driver fatalities and 71 percent of all**

pedestrian deaths occur during dark driving times. This data leads to the conclusion that driving in dark or low-light conditions increases the likelihood of a collision at least partially due to a combination of limited forward illumination by current automotive lighting systems and the speeds at which drivers travel. The efficacy of headlamps compliant with U.S. regulations may be a contributing factor. Research conducted by AAA determined that modern headlamps on low beam provide adequate lighting for speeds of only 39 mph to 52 mph, depending on the type of headlamp

(Ex. 8, AAA 2019 report at 3, emphasis added.)

Researchers associated with Rensselaer Polytechnic Institute, in conjunction with the Transportation Lighting Alliance, published findings in 2014 concluding that the **application of ADB systems could reduce visibility-related nighttime crashes by six to seven percent compared to the visibility provided by low beam headlamp systems.** For this study, a visibility-related crash was assumed to be any nighttime incident involving pedestrians, cyclists, or wildlife in which no alcohol was found present in either the driver or victim. **The justification for using low beam headlamps as the baseline for visibility improvements is related to additional findings in which it was concluded that vehicle operators do not use their high beams in most driving conditions, whether due to oncoming traffic, preceding traffic or negligence. . .** Even after eliminating crashes in which alcohol was detected in the driver or pedestrian, there remained 25,000 instances of pedestrian death or injury as a result of being struck by a motor vehicle in dark lighting conditions. Applying the average economic and societal harm cost rates from the 2010 NHTSA study results in approximately $13.25 billion in damages annually. **If there were a six percent reduction in such crashes from universal adoption of ADB headlamp systems, nearly 1500 pedestrian deaths and injuries could be prevented, and the cost savings would be in excess of $861 million annually**.

(*Id.* at p. 53-54.)

126. Notably, as part of NHTSA's proposed rulemaking in 2018, NHTSA provided an extensive summary of why a long-felt unmet need exists for adaptive driving beam technology.

Excerpts of the NHTSA summary are reproduced below to establish that during the relevant 2002-2003 time period, a long-felt need existed for the glare-free adaptive beam technology [ADB] covered in the reexamination claims of the '551 Patent.

127. Based on the definitions of ADB in the NHTSA Proposed rulemaking, specifically the language boldfaced below, the reexamination claims constitute an Adaptive Driving Beam (ADB) system. The underlined quotes in the below excerpt, provide strong evidence that the ADB system claimed in claim 6 and claims 24-87 satisfies a long-felt but unmet need:

> While the benefits of improved visibility and the harmful effects of glare are difficult to quantify, they are real. For example, a recent study from the Insurance Institute for Highway Safety found that pedestrian deaths in dark conditions increased 56% from 2009 to 2016. The harmful effects of glare are highlighted by the thousands of consumer complaints NHTSA has received from the public over the years, Congressional interest, and the Agency's research. NHTSA received more than 5,000 comments in response to a 2001 Request for Comments on glare from headlamps and other frontal vehicle lamps. Most of these comments concerned nighttime glare. In 2005, Congress directed the Department of Transportation to study the risks of glare. In response to these concerns, NHTSA initiated a multipronged research program to study the risks of, and possible solutions to, glare. **ADB [Adaptive Driving Beam] systems are an advanced type of headlamp beam switching technology that provides increased illumination without increasing glare**. Headlamp beam switching were first introduced in the 1950s, and while not initially widely adopted, have more recently become widely offered as optional equipment. These traditional beam switching systems switch automatically from the upper beam to the lower beam when meeting other vehicles. **ADB systems improve on this technology. They utilize advanced equipment, including sensors (such as cameras), data processing software, and headlamp hardware (such as shutters or LED arrays). ADB systems detect oncoming and preceding vehicles and automatically adjust the headlamp beams to provide less light to the occupied roadway and more light to the unoccupied roadway.**

ADB technology enhances safety in two ways. First, it provides a variable, enhanced lower beam pattern that is sculpted to traffic on the road, rather than just one static lower beam pattern. It provides more illumination than existing lower beams without glaring other motorists (if operating correctly Second, it likely will lead to increased upper beam usage. Research has shown that most drivers under-utilize the upper beams. The effects of this increase as speeds increase, because at higher speeds the need for greater seeing distance increases. ADB technology (like traditional beam switching technology) enables the driver to activate the ADB system so that it is always in use and there is no need to switch between lower beams and upper beams. In this way, the upper beam will be more widely used, and used only when there are no other vehicles present. For both these reasons, ADB has the potential to reduce the risk of crashes by increasing visibility without increasing glare. In particular, it offers potentially significant safety benefits in avoiding collisions with pedestrians, cyclists, animals, and roadside objects.

"Background & Safety Need

ADB technology is an advanced type of semiautomatic headlamp beam switching technology. More rudimentary beam switching technology was first introduced in the 1950s and was limited simply to switching between upper and lower beams. **Adaptive driving beam technology is more advanced. It uses advanced sensors and computing technology that more accurately and precisely detect the presence and location of other vehicles and shape the headlamp beams to provide enhanced illumination of unoccupied portions of the road and avoid glaring other vehicles."**

"The Twin Safety Needs of Glare

Vehicle headlamps must satisfy two different safety needs: Visibility and glare prevention. Headlamps provide forward visibility (and also work in conjunction with parking lamps on passenger cars and other narrow vehicles to provide conspicuity). They also have the potential to glare other motorists and road users.

For this reason, headlighting systems include a lower beam and an upper beam. Lower beams (also referred to as passing beams or dipped beams) illuminate the road and its environs close ahead of the vehicle and are intended for use during low speed driving or when meeting or closely following another vehicle. Upper beams (also referred to as high beams, main beams, or driving beams) are intended primarily for distance illumination and for use when not meeting or closely following another vehicle. The lower beam pattern is designed to produce relatively high levels of light only in the close-in forward visibility region; the upper beam is designed to produce high light levels in close-in and longer distance regions. Thus, headlighting has traditionally entailed a trade-off between forward longer-distance visibility for the driver and glare to other road users.

Visibility and glare are both related to motor vehicle safety. Visibility has an obvious, intuitive relation to safety: The better a driver can see the road, the better he or she can react to road conditions and obstacles and avoid crashes. Although the qualitative connection to safety is intuitive, quantifying the effect of visibility on crash risk is difficult because of many confounding factors (for example, was the late-night crash because of diminished visibility or driver fatigue?). Glare, again intuitively, is related to safety because it degrades a driver's ability to see the forward roadway and any unexpected obstacles. Glare is a sensation caused by bright light in an observer's field of view. It reduces the ability to see and/or causes discomfort. Headlamp glare is the reduction in visibility and discomfort caused by viewing headlamps of oncoming or trailing vehicles (via the rearview or side mirrors).1 Empirical evidence suggests that headlamp glare degrades important aspects of driving performance, such as decreasing the distance at which an object in or near the roadway can be seen, increasing driver reaction times, and reducing the probability a driver will detect an object.2 It is difficult, however, to quantify the effect of glare on crash risk.

The potential problems associated with glare are highlighted by the thousands of complaints NHTSA has received from the public on the issue. The introduction of

> halogen headlamp technology in the late 1970s and high intensity discharge and auxiliary headlamps in the 1990s was accompanied by a marked upswing in the number of glare complaints to NHTSA. In response to increased consumer complaints about glare in the late 1990s, NHTSA published a Request for Comments in 2001 on issues related to glare from headlamps, fog lamps, driving lamps, and auxiliary headlamps. NHTSA received more than 5,000 comments, most of which concerned nighttime glare from front mounted lamps."

(Ex. 4, NHTSA Proposed Rule 2018, at 2-5, emphasis added.)

128. Based on the above examples of industry praise, teaching away, and long felt but unmet need and their nexus to the claimed invention, I conclude that there is sufficient objective evidence during the relevant time frame and given the state of the industry at that time that the reexamination claims are not an obvious combination or modification of the prior art teachings of Stam PCT and Harbers.

XII. CONCLUSION

129. For the forgoing reasons, it is my opinion that the claims presented in the request for reexamination are patentable over the prior art. I further declare that all statements made herein are of my own knowledge and are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment or both pursuant to 18 U.S.C. §1001 and that willful false statements or the like may jeopardize the validity of the patent or any patent issuing thereon.

Signed in Chicago, IL on July 23, 2021.

Respectfully submitted,

Joseph S. Stam

Exhibit OTH-B

Joseph Stam *Curriculum Vitae*

Joseph S Stam

2238 Black Lake Ave. Holland MI 49424 Phone: 616.403.7592 E-mail: joestam@gmail.com

Highlights

- Highly experienced hardware engineer and performance software programmer.
- GPU computing master: Strong proficiency with NVIDIA CUDA and GPU optimization.
- CPU software performance computing expert, including AVX/SSE.
- Extensive experience with custom circuit design, operation and manufacturing.
- Experienced manager of technical staff.
- Successful product innovator: Designed award winning automotive vision systems which have shipped millions of units.
- Prolific inventor with numerous patents.
- Enthusiastic presenter and trainer, comfortable with large audiences and prestigious venues.
- Language Experience includes: C, C++, CUDA, R, x86 assembly (SSE/AVX) on Linux and Windows server and supercomputing platforms.

Experience

Jump Trading 2012-Present

- Senior front office trading team member with diverse responsibilities developing low latency trading algorithms and high-performance computing applications. Duties range from software optimization for high speed trading, computational data analytics, analysis of financial market data and feeds, trading infrastructure design, and vendor relationship building.

NVIDIA Corporation, 2007-2012; Principal Computer Vision Architect

- Crafted and implemented NVIDIA's early strategy for computer vision on GPUs, a key technology area which heavily leverages NVIDIA's strong computation advantages over competitors.
- Built and led a team of computer vision scientists to develop algorithms and optimize for NVIDIA hardware.
- Managed development of NVIDIA's optimized implementation of OpenCV on both discrete GPUs and mobile processors, including oversight of large external developer contract.
- Expert in GPU computing with NVIDIA CUDA. Emphasis on pattern recognition, computer vision, imaging and video processing.
- Provide extensive application development support to 3rd party developers, including optimization of production software (e.g. Adobe Premiere Pro CS5).
- Evangelize NVIDIA CUDA at many conferences, universities, and corporations.
- Author of technical whitepapers and "Image Demosaicing" chapter in GPU Computing Gems (published 2011).
- Worked in embedded, automotive and professional business units.

Hope College, Part-Time Engineering Instructor; 2009-2010

- Substitute part-time instructor for introductory undergraduate engineering and electronics labs.

Gentex Corporation, Senior Research Scientist; 1996-2007

- Chief engineer for research, development and production for Gentex's *SmartBeam*™ automatic highbeam headlamp control product. Uses a CMOS camera and proprietary algorithms to detect and respond to traffic. A miniature neural network computer vision system, likely the first volume production use of computer vision AI in automobiles.
- Sold millions of units to date, awarded Popular Science's 2005 *Best of What's New* award, and Automotive News *Pace* award.
- Lead designer of electronics hardware and software algorithms.
- Managed design of several generations of high sensitivity and high dynamic range custom CMOS image sensors and control ASICs.
- Designed camera optics and optical assembly methods.
- Developed proprietary pattern recognition algorithms, extensive experience with neural networks and statistical regression techniques.
- Created a unique, very low-latency pipeline for rapid image acquisition, analysis, and interface with vehicle network.
- Managed a strategic alliance and investment with Photobit Corporation, a pioneering company formed by the NASA scientists who invented the CMOS image sensor. Ancestor to Aptina Imaging, Micron, and now On Semiconductor, a current world-leading image sensor company.
- Instrumental in creating a complete microelectronics production competency for wafer-level sensor testing through image sensor package assembly.
- Actively involved in intellectual property issues including patent prosecution, litigation, licensing and overall IP strategy.

Intellectual Property

- Inventor on 95 issued US patents and numerous foreign patents.
- Inventions include: Image sensor technologies, computer architecture, computer vision and image processing algorithms, headlamp control systems, optical systems, image sensor packaging, LED lighting, light sensors, and many others.
- Regularly drafted my own patent specifications and claims.
- Deeply involved in overall corporate IP strategy, including competitive portfolio analysis.
- Experienced at prior art searching and design-around.
- Participated in many in-person USPTO examiner reviews.
- Subject of US patent interference, heavily involved in all proceedings.

Education

Hope College, Holland MI, B.S. 1996. Majors: Engineering Physics, Computer Science. GPA 3.6/4.0 overall, 3.9/4.0 major

Michigan State University, East Lansing MI, M.S. Electrical Engineering 2001 (completed while employed at Gentex). Emphasis in Solid State Electronic Devices, elective coursework in optics and image processing. GPA: 3.8/4.0

Military

Michigan Army National Guard 1991-1997. Served as an Infantryman and achieved rank Sergeant E5

Exhibit OTH-C
New Claims

WHAT IS CLAIMED IS:

24. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine first coordinates corresponding to an other vehicle, based on the coordinate-specific information;

select a cluster of the LEDs that emit light toward at least a portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates; and

change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle.

25. (New) The illuminating device of claim 24, wherein:

the changed emission includes a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state; and

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs.

26. (New) The illuminating device of claim 24, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.

27. (New) The illuminating device of claim 26, wherein:

the changed emission includes a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state;

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

28. (New) The illuminating device of claim 26, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

29. (New) The illuminating device of claim 26, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

30. (New) The illuminating device of claim 24, further including one or more optical control elements to control light emitted from one or more of the LEDs.

31. (New) The illuminating device of claim 30, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

32. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least one target, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

create a beam of diminished illumination illuminating at least a portion of the at least one target with non-glaring illumination, created within a broader field of illumination having different intensity than the beam, by one or more changes to characteristics of first light of a cluster of the LEDs providing the first light directed at the at least a portion and creating the beam, the beam diminished in intensity relative to the broader field of illumination illuminating at least above and on both sides of the beam; and

follow, based at least in part on data from one or more of the cameras, the at least one target with the diminished illumination as the at least one target changes location relative to the motor vehicle.

33. (New) The illuminating device of claim 32 wherein:

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select the cluster of LEDs based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp;

the data includes image data;

the one or more changes to characteristics of the first light include a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state; and

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs.

34. (New) The illuminating device of claim 32, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.

35. (New) The illuminating device of claim 34, wherein:

the one or more changes to characteristics of the first light include a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state;

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select the cluster of LEDs based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

36. (New) The illuminating device of claim 34, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

37. (New) The illuminating device of claim 34, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

38. (New) The illuminating device of claim 32, further including one or more optical control elements to control light emitted from one or more of the LEDs.

39. (New) The illuminating device of claim 38, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

40 (New) An illuminating device having automatic control of light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least two other vehicles, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine a first cluster of the LEDs illuminating at least a first portion of a first other vehicle based at least in part on data from one or more of the sensors indicating a first position associated with the first other vehicle;

diminish glaring illumination of the first other vehicle by a first change to one or more characteristics of first light of at least the first cluster;

determine a second, different cluster of the LEDs illuminating at least a second portion of a second other vehicle based at least in part on the data indicating a second position associated with the second other vehicle;

diminish glaring illumination of the second other vehicle by a second change to one or more characteristics of second light of at least the second, different cluster.

wherein the first and second changes decrease intensity of first emission from the first cluster and second emission from the second cluster relative to a third emission, from the at least one headlamp, illuminating an area between the first and second portion.

41. (New) The illuminating device of claim 40, wherein:

the data includes image data;

at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED of the respective cluster to a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the determination of the first cluster includes selection of the first cluster based at least in part on known aimings of light associated with the first cluster having a correlation to the first position, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the determination of the second cluster includes selection of the second cluster based at least in part on known aimings of light associated with the second cluster having a correlation to the second position, the known aimings based at least in part on at least one of known directionality of light emitted by the second cluster or known directionality of light emitted by the second cluster exiting the headlamp.

42. (New) The illuminating device of claim 40, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.

43. (New) The illuminating device of claim 42, wherein:

at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED of the respective cluster to a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the determination of the first cluster includes selection of the first cluster based at least in part on known aimings of light associated with the first cluster having a correlation to the first position, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp;

the determination of the second cluster includes selection of the second cluster based at least in part on known aimings of light associated with the second cluster having a correlation to the second position, the known aimings based at least in part on at least one of known directionality of light emitted by the second cluster or known directionality of light emitted by the second cluster exiting the headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

44. (New) The illuminating device of claim 42, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

45. (New) The illuminating device of claim 42, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

46. (New) The illuminating device of claim 40, further including one or more optical control elements to control light emitted from one or more of the LEDs.

47. (New) The illuminating device of claim 46, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

48. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information, communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

illuminate a portion of at least one object, indicated by data from at least one of the one or more sensors, by selecting a first cluster of the LEDs to emit first light directed towards a first area including the at least the portion of at least one object, the first area determined based at least in part on the data, the first cluster selected based at least in part on known aimings of light associated with the first cluster determined to correspond to the first area, and the first light determined based at least in part on classifying the object based at least in part on the data; andcontrol light emitted from the first cluster directed towards the

first area to be different in at least one emission characteristic, based on the first light determination, from second light emitted from a second, different cluster of the LEDs, directed towards one or more illuminated second areas at a common elevation with the first area and laterally adjacent to the first area.

49. (New) The illuminating device of claim 48, wherein:

the data includes image data;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to illuminate the at least the portion with light below at least a predefined glare level;

the at least one object includes at least one of a pedestrian, a sign, or another vehicle;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the control of the light emitted from the first cluster includes a change of at least one LED of the cluster to a non-emitting state;

the at least one emission characteristic is different following modification by an optical control element; and

the known aimings of light associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp.

50. (New) The illuminating device of claim 48, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

51. (New) The illuminating device of claim 50, wherein:

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to illuminate the at least the portion with light below at least a predefined glare level;

the at least one object includes at least one of a pedestrian, a sign, or another vehicle;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the control of the light emitted from the first cluster includes a change of at least one LED of the cluster to a non-emitting state;

the at least one emission characteristic is different following modification by an optical control element;

the known aimings of light associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

52. (New) The illuminating device of claim 50, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

53. (New) The illuminating device of claim 50, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

54. (New) The illuminating device of claim 48, further including one or more optical control elements to control light emitted from one or more of the LEDs.

55. (New) The illuminating device of claim 54, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

56. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least one other vehicle ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine, based on data from one or more of the sensors, a vertical and horizontal position associated with the at least one other vehicle;

select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and

reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative to intensity of illumination on both sides of the

first area at elevations common with the first area illuminated by a second cluster of the LEDs, by control of emission from the first cluster.

57. (New) The illuminating device of claim 56, wherein:

the data includes image data;

the control of emission of the first cluster includes a change of at least one of color or intensity or control of at least one LED of the first cluster into a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs; and

the known light aimings associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp.

58. (New) The illuminating device of claim 56 wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

59. (New) The illuminating device of claim 58, wherein:

the control of emission of the first cluster includes a change of at least one of color or intensity or control of at least one LED of the first cluster into a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the known light aimings associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

60. (New) The illuminating device of claim 58, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

61. (New) The illuminating device of claim 58, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

62. (New) The illuminating device of claim 56, further including one or more optical control elements to control light emitted from one or more of the LEDs.

63. (New) The illuminating device of claim 62, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

64. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs and in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of another vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

select a first cluster of the LEDs having light associated therewith that is directed towards the other vehicle based at least in part on first data from one or more of the sensors indicating a first position associated with the other vehicle;

control a first change to one or more characteristics of the light associated with the first cluster of the LEDs that is directed towards the other vehicle, that diminishes glare to a driver of the other vehicle when the other vehicle is at the first position;

select a second, different cluster of the LEDs having light associated therewith that is directed towards the other vehicle based at least in part on second, subsequent data from one or more of the sensors indicating a second, subsequent position associated with the other vehicle; and

control a second, subsequent change, to one or more characteristics of the light that is subsequently directed towards the other vehicle, that diminishes glare to the driver of the other vehicle when the other vehicle is at the second position.

65. (New) The illuminating device of claim 64, wherein:

the first data or second data includes image data;

at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED of the respective cluster to a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs; and

the light that is directed or subsequently directed towards the other vehicle is determined based at least in part on known directionality of light emitted by the respective first or second cluster exiting the at least one headlamp.

66. (New) The illuminating device of claim 64, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

67. (New) The illuminating device of claim 66, wherein:

at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED of the respective cluster to a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the light that is directed or subsequently directed towards the other vehicle is determined based at least in part on known directionality of light emitted by the respective first or second cluster exiting the at least one headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

68. (New) The illuminating device of claim 66, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

69. (New) The illuminating device of claim 66, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

70. (New) The illuminating device of claim 64, further including one or more optical control elements to control light emitted from one or more of the LEDs.

71. (New) The illuminating device of claim 70, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

72. (New) An illuminating device having automatic control of the light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine a target based on first data from one or more of the sensors;

determine a first target location based on the first data;

select a cluster of the LEDs having light associated therewith that is directed at the target, determined based on the first target location;

vary illumination provided to the target by the selected cluster, relative to illumination provided to areas laterally adjacent to the target and provided by at least one LED different from LEDs in the selected cluster; and

maintain a variance of illumination provided to the target relative to the laterally adjacent areas, when subsequent data from one or more of the cameras indicates a change in position of the target relative to the motor vehicle, by repeating the determination of target location, selection of the cluster and variance to illumination provided to the target, relative to the laterally adjacent areas, based on the subsequent data.

73. (New) The illuminating device of claim 72, wherein:

the variation of illumination provided to the target includes variation in at least one of color or intensity or at least a change of at least one LED of the selected cluster to a non-emitting state;

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs;

the light directed at the target is determined based at least in part on known directionality of light emitted by the first cluster exiting from the at least one headlamp; and

at least one of the first data or the subsequent data includes image data.

74. (New) The illuminating device of claim 72, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

75. (New) The illuminating device of claim 74, wherein:

the variation of illumination provided to the target includes variation in at least one of color or intensity or at least a change of at least one LED of the selected cluster to a non-emitting state;

the selected cluster includes a plurality of the LEDs and the selected cluster includes non-contiguous LEDs;

the light directed at the target is determined based at least in part on known directionality of light emitted by the first cluster exiting from the at least one headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

76. (New) The illuminating device of claim 74, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

77. (New) The illuminating device of claim 74, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

78. (New) The illuminating device of claim 72, further including one or more optical control elements to control light emitted from one or more of the LEDs.

79. (New) The illuminating device of claim 78 wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

80. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements,

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture camera data indicating a target ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

identify, based on data received from one or more of the sensors, a plurality of positions associated with the target as the target moves relative to the motor vehicle; and

change, responsive to the positions associated with the target, first light associated with one or more LEDs aimed toward at least a portion of the target, relative to second light associated with other one or more of the LEDs aimed laterally adjacent the target on either side, as the target moves relative to the motor vehicle.

81. (New) The illuminating device of claim 80, wherein:

the data includes image data;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select a first cluster of LEDs, associated with the first light, for the change, based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the change to emission of the one or more LEDs aimed towards the at least the portion includes a change to intensity or color or a change of at least one of the LEDs to a non-emitting state.

82. (New) The illuminating device of claim 80, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.

83. (New) The illuminating device of claim 82, wherein:

the change to emission of the one or more LEDs aimed towards the at least the portion includes a change to intensity or color or a change of at least one of the LEDs to a non-emitting state;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select a first cluster of LEDs, associated with the first light, for the change, based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

84. (New) The illuminating device of claim 82, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

85. (New) The illuminating device of claim 82, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

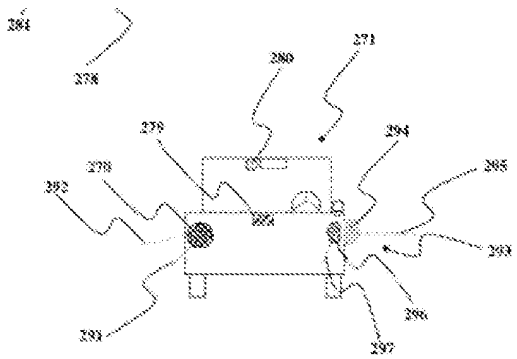
86. (New) The illuminating device of claim 80, further including one or more optical control elements to control light emitted from one or more of the LEDs.

87. (New) The illuminating device of claim 86, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

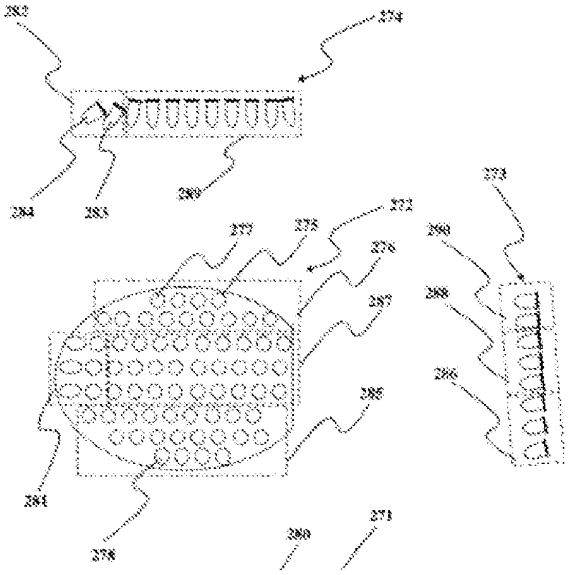
Exhibit OTH-D
Support for New Claims

Support for New Claims for '551 Patent

Representative support for the new claims may be found at least in the following sections and Figures of the '551 Patent:

Proposed Claim	**Support from '551 Patent**
24. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**
a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	**Claim 6 of the '551 Patent** **Fig. 15 (bottom):**  **53:45-54:47** Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a

cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**.

	The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Claim 6 of the '551 patent** **Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light

distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

17:3-16

As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital

	luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**
one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range.

least one of the one or more processors;	**25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer

	algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …
memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
determine first coordinates corresponding to an other vehicle, based on the coordinate-specific information;	**45:53-55** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which

will project light at the speaker as the speaker move about the room.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

52:54-65

Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

	95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
select a cluster of the LEDs that emit light toward at least a portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates; and	**45:53-55** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **52:54-65** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to

	determine which exact aiming is the maximum allowable for any given traffic situation and road layout.
	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.
	95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle.	**45:53-55** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **52:54-65** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating

	devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
25. (New) The illuminating device of claim 24, wherein: the changed emission includes a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state; and the cluster includes a plurality of the LEDs and	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand. **53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction

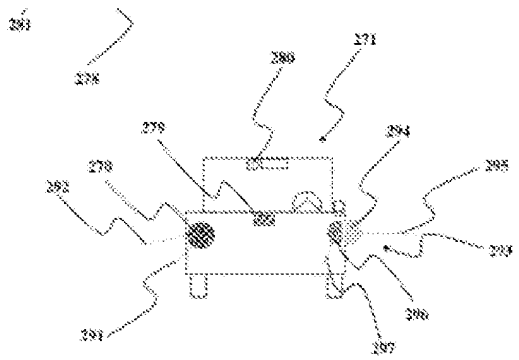
the cluster includes non-contiguous LEDs.	with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
26. (New) The illuminating device of claim 24, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to: identify an upcoming road curvature along a road on which the motor vehicle is traveling; and accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of town. At any instant in time the intensity, spectrum and beam patter of the head-lamp may be varied as a function of the drivers intent, lay of the road and environmental factors. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and other factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime. **51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern

	and color spectrum will be changed according to the instantaneous road conditions at hand. **51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
27. (New) The illuminating device of claim 26, wherein: the changed emission includes a change to at least one of intensity or color or a change of at least one LED of the	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.

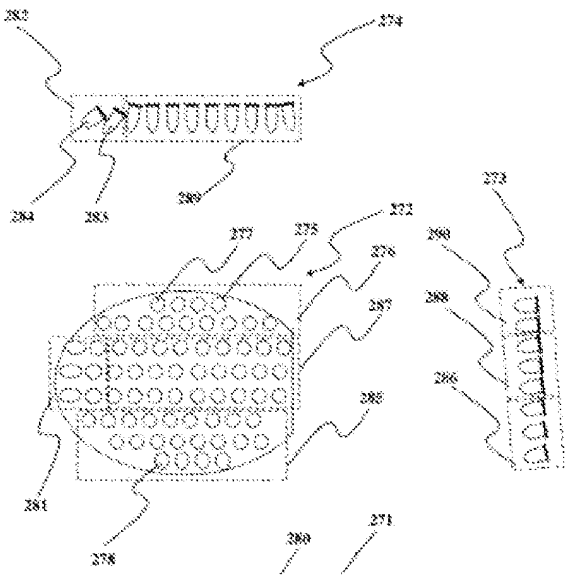
cluster to a non-emitting state; the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs; and	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **51:51-56** At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
28. (New) The illuminating device of claim 26, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At any

adaptation of the light pattern is based at least in part on the map data.	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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
29. (New) The illuminating device of claim 26, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.

30. (New) The illuminating device of claim 24, further including one or more optical control elements to control light emitted from one or more of the LEDs.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
31. (New) The illuminating device of claim 30, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
32. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**
a structure for incorporating illuminating device elements, wherein	**Claim 6 of the '551 Patent**

the structure comprises a motor vehicle;	**Fig. 15 (bottom):**  **53:45 – 54:47** Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with

	SLSs of front view **272** cluster **285** corresponding to cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one	**Claim 6 of the '551 patent**

headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**FIG. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not

	necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **17:3-16** As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**

one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least one target, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. 25:53-67 Sensors 8 include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may

	be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area, and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
create a beam of diminished illumination illuminating at least a portion of the at least one target with non-glaring illumination, created within a broader field of illumination having different intensity than the beam, by one or more changes to characteristics of first light of a cluster of the LEDs providing the first light directed at the at least a portion and creating	**52:54 - 53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. Using color and pattern recognition techniques it is possible to determine what is a sign. It is then possible to provide the equivalent

the beam, the beam diminished in intensity relative to the broader field of illumination illuminating at least above and on both sides of the beam; and	of "task lighting" and 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. **22:14-22** In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting. **22:26-48** In another example of prior art practice a table lamp for reading is provided with a shade. The shade is there to partially redirect the light onto the book and also prevent direct, glaring, rays from the lamp used for general lighting from reaching the reader's eyes. According to the present invention, instead of having a glaring lamp producing light which is then made non-glaring by a shade at a loss in excess of 50% the LF is built such the amounts of light directed downward at useful angles and the amount of light directed upward are in the correct ratio. The surface area, from which discomfort-glare causing rays exit, is designed such that the luminous exitance is within recommended UGR levels for home use. The fixture has no need for a shade to protect from glare; the glare was never produced at those angles to begin with due to proper geometric design. To get the desired luminous exitance expressed in terms of

	lumen per sq. meter or luminance in terms of candela per sq. meter, the light exiting the source of specific intensity at angles which normally reach the room occupant's eyes, is spread over an area such that the exiting light is non-glaring. These lighting design parameters serve as the product specification and are incorporated into the initial design. There is no need to add on components to achieve correct lighting. 45:27-44 In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
follow, based at least in part on data from one or more of the cameras, the at least one target with the	**45:45-67** In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the

diminished illumination as the at least one target changes location relative to the motor vehicle.	pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. It is to be understood that in a theater lighting application there is no need for a preprogrammed moving light using motors to change position. Instead a fixed DLF or ADLF with multiple light sources powers the necessary light sources to illuminate the performer as he or she moves about the stage. This actually is similar to the banks of shuttered lights used in present day stage lighting. Only now the digital aspect of discrete multiple light sources allowing for a smooth transition of aimings with instantaneous control of almost infinite variation of spectrum and intensity is accomplished. **51:59-65** Additional features include an optional concentrated flashlight type of beam to illuminate distant overhead and roadside signs, which due to the narrow directed beam will not blind oncoming traffic. Image recognition via a camera will allow the beam to follow the retroreflective sign as the vehicle moves or the signs will be provided with a special marker for this purpose.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

33. (New) The illuminating device of claim 32 wherein:	
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select the cluster of LEDs based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp;	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

	95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the data includes image data;	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the one or more changes to characteristics of the first light include a change to at least one of intensity or	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and

color or a change of at least one LED of the cluster to a non-emitting state; and	spatial distribution of intensity and spectral distribution for the viewing task at hand.
the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs.	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
34. (New) The illuminating device of claim 32, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the

	optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
identify an upcoming road curvature along a road on which the motor vehicle is traveling; and	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.	**51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.

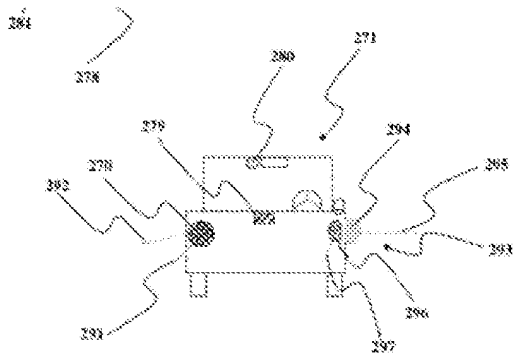
35. (New) The illuminating device of claim 34, wherein:	
the one or more changes to characteristics of the first light include a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which

controller to select the cluster of LEDs based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and	will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such

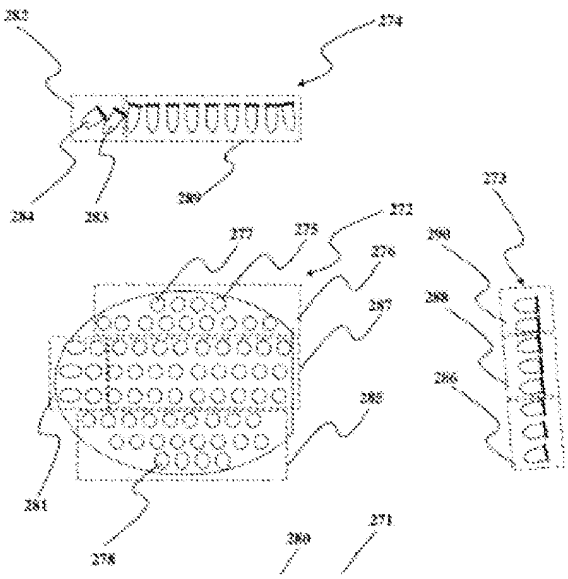
	changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.	**51:51-56** At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
36. (New) The illuminating device of claim 34, wherein the identification of the upcoming road curvature	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous

is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.	road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
37. (New) The illuminating device of claim 34, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.

38. (New) The illuminating device of claim 32, further including one or more optical control elements to control light emitted from one or more of the LEDs.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
39. (New) The illuminating device of claim 38, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements
40. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 patent**
a structure for incorporating illuminating device elements, wherein	**Claim 6 of the '551 Patent**

the structure comprises a motor vehicle;	**Fig. 15 (bottom):**  **53:45-54:47** Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to

	cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the	**Claim 6 of the '551 patent**

structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not

	necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **17:3-16** As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**

one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least two other vehicles, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may

	be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
determine a first cluster of the LEDs illuminating at least a first portion of a first other vehicle based at least in part on data from one or more of the sensors indicating a first position associated with the first other vehicle;	**53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown

by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

52:27-42

A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the

pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which

	disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
diminish glaring illumination of the first other vehicle by a first change to one or more characteristics of first light of at least the first cluster;	**52:54-53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam. **22:14 – 22** In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a

workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting.

45:27-44

In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other

	radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
determine a second, different cluster of the LEDs illuminating at least a second portion of a second other vehicle based at least in part on the data indicating a second position associated with the second other vehicle;	**53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power

distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

52:27-42

A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of

headlamps from oncoming vehicles and tail lamps from leading vehicles.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

	~~95:3-14~~ There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
diminish glaring illumination of the second other vehicle by a second change to one or more characteristics of second light of at least the second, different cluster,	**52:54-53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam.

22:14-22

In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting.

45:27-44

In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will

	control the luminance by varying the spatial light intensity distribution over the different surfaces. 1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. 95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

wherein the first and second changes decrease intensity of first emission from the first cluster and second emission from the second cluster relative to a third emission, from the at least one headlamp, illuminating an area between the first and second portion.	**22:14-22** In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting. 45:27-44 In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

41. (New) The illuminating device of claim 40, wherein:	
the data includes image data;	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.
at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.

of the respective cluster to a non-emitting state;	
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the determination of the first cluster includes selection of the first cluster based at least in part on known aimings of light associated with the first cluster having a correlation to the first position, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of

emitted by the first cluster exiting the headlamp; and	lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the determination of the second cluster includes selection of the second cluster based at least in part on known aimings of light associated with the second cluster having a correlation to the second	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

position, the known aimings based at least in part on at least one of known directionality of light emitted by the second cluster or known directionality of light emitted by the second cluster exiting the headlamp	**25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are

	deemed to be covered by the invention without departing from the spirit or scope of the following claims.
42. (New) The illuminating device of claim 40, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
identify an upcoming road curvature along a road on which the motor vehicle is traveling; and	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.	**51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
43. (New) The illuminating device of claim 42, wherein:	
at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED of the respective cluster to a non-emitting state;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or	53:27-37 The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function

the second cluster includes non-contiguous LEDs;	versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the determination of the first cluster includes selection of the first cluster based at least in part on known aimings of light associated with the first cluster having a correlation to the first position, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp;	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

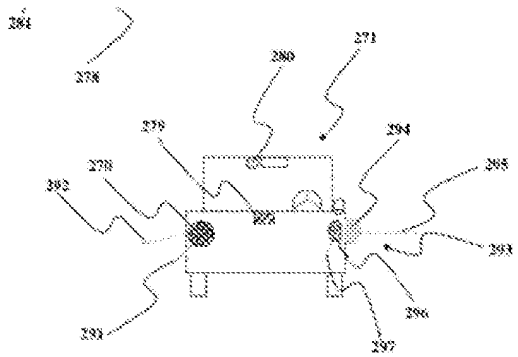
	95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the determination of the second cluster includes selection of the second cluster based at least in part on known aimings of light associated with the second cluster having a correlation to the second position, the known aimings based at least in part on at least one of known directionality of light emitted by the second cluster or known directionality of light emitted by the second	51:51-56 At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.

cluster exiting the headlamp; and the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.	
44. (New) The illuminating device of claim 42, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At any

adaptation of the light pattern is based at least in part on the map data.	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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
45. (New) The illuminating device of claim 42, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.

46. (New) The illuminating device of claim 40, further including one or more optical control elements to control light emitted from one or more of the LEDs.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
47. (New) The illuminating device of claim 46, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
48. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 patent**
a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	**Claim 6 of the '551 Patent**

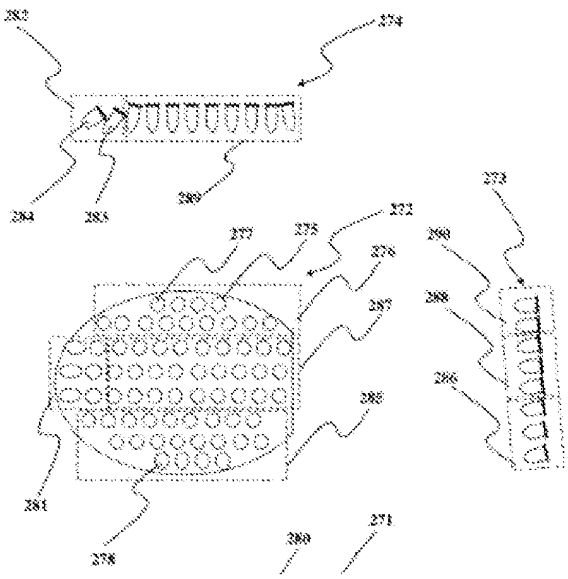
Fig. 15 (bottom):



53:45-54:.47

Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to

	cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the	**Claim 6 of the '551 patent**

structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not

	necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **17:3-16** As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**

one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may

	be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42 – 50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
illuminate a portion of at least one object, indicated by data from at least one of the one or more sensors, by selecting a first cluster of the LEDs to emit first light directed towards a first area including the at least the portion of at least one object, the first area determined based at least in part on the data, the first cluster selected based at least in part on known aimings of light associated	**50:37-56** The digital lighting concept is extended to transportation vehicle applications. A headlamp for an automobile uses multiple light sources based on electro luminescence of semiconductor junctions. The proposed unique approach is to combine the lighting engineering function i.e. the correct light distribution, color spectrum and level necessary for the visual task at hand into the lamp such that the digital lamp obviates the need for additional light controls and fixtures. The digital electronic lamp utilizes ⅓ the energy and has over 100,000 hours lifetime versus 2000 for an automotive incandescent lamp and can be rapidly switched on and off without deleteriously affecting lifetime. (Quite the opposite, off time is not part of the lifetime). The multiple light-source, digital device, is an electronic headlight which provides the driver with the correct aiming, illumination level and distribution (e.g. parking

with the first cluster determined to correspond to the first area, and the first light determined based at least in part on classifying the object based at least in part on the data; and control light emitted from the first cluster directed towards the first area to be different in at least one emission characteristic, based on the first light determination, from second light emitted from a second, different cluster of the LEDs, directed towards one or more illuminated second areas at a common elevation with the first area and laterally adjacent to the first area.	lights, low beam, high beam, lighting around curves and corners) based on input from the vehicle's speed, steering wheel position, turn signal indicator and detection of approaching headlights. **51:43-52** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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 **52:62-53:4** Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam.

45:52-57

The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

19:17-30

The basis of the invention is the use of a multitude of discrete light emitting sources ("digits") to generate light. The light control elements can be applied on a per junction basis or on a "white" color generating set grouping such as RGB or on a larger set which may be convenient for manufacturing or other color rendering considerations. The requirement for controllability is however, that the SLS output is definitive in relation to spectrum and spatial distribution.

The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.

53:13-37

In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic

or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED 277 at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster 278 which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

52:54-53:4

Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

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, yet not blind oncoming traffic due to the narrow beam.

22:14-22

In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting.

45:27-44

In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will

	control the luminance by varying the spatial light intensity distribution over the different surfaces. 1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. 95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

49. (New) The illuminating device of claim 48, wherein:	
the data includes image data;	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to illuminate the at least the portion with light below at least a predefined glare level;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand. The digital headlamp solves this problem by automatically sensing the angle of the headlamp assembly and will employ in real time

	only the properly aimed light sources to illuminate so as not to glare oncoming traffic.
the at least one object includes at least one of a pedestrian, a sign, or another vehicle;	**52:62-53:12** Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam. Wavelength specific SLSs in the infrared or near Ultra Violet spectrum, not visible to the driver by the unaided eye are used for communication between vehicles and roadway controllers or toll booths. Infrared SLS will provide radiation to be reflected from objects for night vision cameras. UV SLS are used for or illuminating UV fluorescent dyes in clothing bicycles and baby carriages to increase pedestrian visibility as is known in the art. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered

	as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

the control of the light emitted from the first cluster includes a change of at least one LED of the cluster to a non-emitting state;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
the at least one emission characteristic is different following modification by an optical control element; and	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
the known aimings of light associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp.	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
50. (New) The illuminating device of	**51:43-47**

claim 48, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:	Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
identify an upcoming road curvature along a road on which the motor vehicle is traveling; and	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.	**51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.

51. (New) The illuminating device of claim 50, wherein:	
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to illuminate the at least the portion with light below at least a predefined glare level;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
the at least one object includes at least one of a pedestrian, a sign, or another vehicle;	**52:62-53:12** Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam. Wavelength specific SLSs in the infrared or near Ultra Violet spectrum, not visible to the driver by the unaided eye are used for

communication between vehicles and roadway controllers or toll booths. Infrared SLS will provide radiation to be reflected from objects for night vision cameras. UV SLS are used for or illuminating UV fluorescent dyes in clothing bicycles and baby carriages to increase pedestrian visibility as is known in the art.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

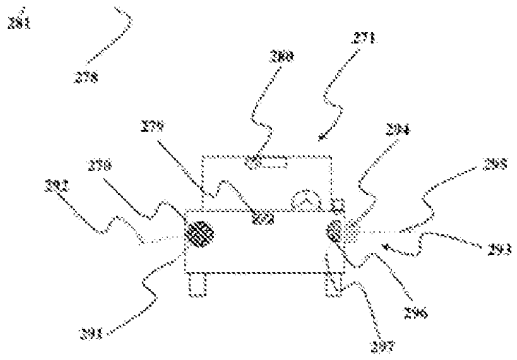
There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be

	covered by the invention without departing from the spirit or scope of the following claims.
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the control of the light emitted from the first cluster includes a change of at least one LED of the cluster to a non-emitting state;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
the at least one emission characteristic is different following modification by an optical control element;	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
the known aimings of light associated with the first cluster is based at least on	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates

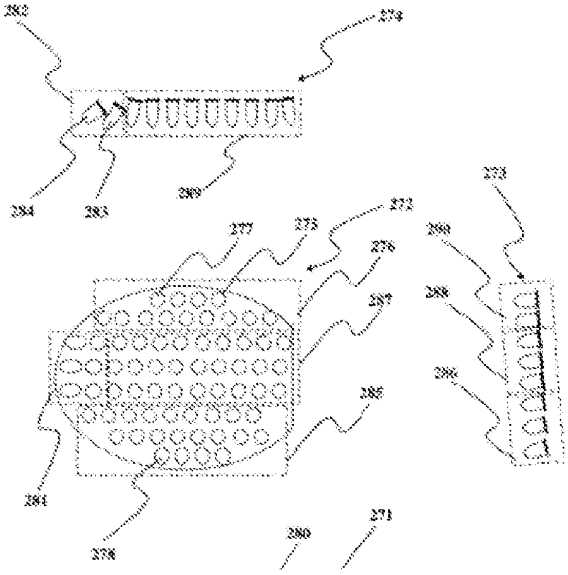
part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp; and the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.	instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings

	which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims. **51:51-56** At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location
52. (New) The illuminating device of claim 50, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow

	conditions etc. lighting can be adapted to the optimal operating regime.
53. (New) The illuminating device of claim 50, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
54. (New) The illuminating device of claim 48, further including one or more optical control elements to control light emitted from one or more of the LEDs.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.

55. (New) The illuminating device of claim 54, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
56. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**
a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	**Claim 6 of the '551 Patent** **Fig. 15 (bottom):** 

	53:45-54:47 Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In

	one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Claim 6 of the '551 patent** **Fig. 15 (top):** 

53:13-37

In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

17:3-16

As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes

	of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**
one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or

illuminated area and positioned to capture an image of at least one other vehicle ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored

arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …
memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.

determine, based on data from one or more of the sensors, a vertical and horizontal position associated with the at least one other vehicle;	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.
select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of

	headlamps from oncoming vehicles and tail lamps from leading vehicles. **52:62-53:4** Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam. **45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **19:17-30** The basis of the invention is the use of a multitude of discrete light emitting sources ("digits") to generate light. The light control elements can be applied on a per junction basis or on a "white" color generating set grouping such as RGB or on a larger set which may be convenient for manufacturing or other color rendering considerations. The requirement for controllability is however, that

the SLS output is definitive in relation to spectrum and spatial distribution.

The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.

53:13-37

In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second

cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative to intensity of illumination on both sides of the first area at elevations common with the first area illuminated by a second cluster of the LEDs, by control of emission from the first cluster.	**50:37-56** The digital lighting concept is extended to transportation vehicle applications. A headlamp for an automobile uses multiple light sources based on electro luminescence of semiconductor junctions. The proposed unique approach is to combine the lighting engineering function i.e. the correct light distribution, color spectrum and level necessary for the visual task at hand into the lamp such that the digital lamp obviates the need for additional light controls and fixtures. The digital electronic lamp utilizes ⅓ the energy and has over 100,000 hours lifetime versus 2000 for an automotive incandescent lamp and can be rapidly switched on and off without deleteriously affecting lifetime. (Quite the opposite, off time is not part of the lifetime). The multiple light-source, digital device, is an electronic headlight which provides the driver with the correct aiming, illumination level and distribution (e.g. parking lights, low beam, high beam, lighting around curves and corners) based on input from the vehicle's speed, steering wheel position, turn signal indicator and detection of approaching headlights. **52:54-53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to

determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

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, yet not blind oncoming traffic due to the narrow beam.

22:14-22

In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting.

45:27-44

In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the

luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications

	which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
57. (New) The illuminating device of claim 56, wherein:	
the data includes image data;	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.
the control of emission of the first cluster includes a change of at least one of color or intensity or control of at least one LED	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and

of the first cluster into a non-emitting state;	spatial distribution of intensity and spectral distribution for the viewing task at hand.
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs; and	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the known light aimings associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp.	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
58. (New) The illuminating device of	**51:43-47**

claim 56 wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:	Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
identify an upcoming road curvature along a road on which the motor vehicle is traveling; and	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.	**51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.

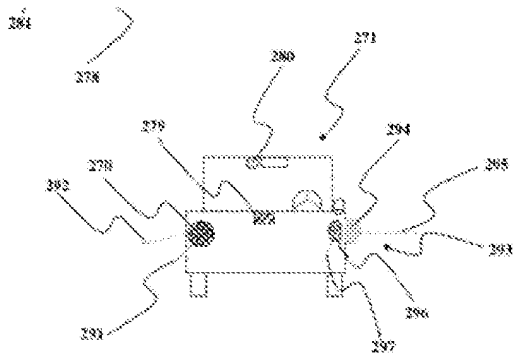
59. (New) The illuminating device of claim 58, wherein:	
the control of emission of the first cluster includes a change of at least one of color or intensity or control of at least one LED of the first cluster into a non-emitting state;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the known light aimings associated with the first cluster is based at least on part on known directionality of light	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which

emitted by LEDs of the first cluster exiting from the at least one headlamp; and	will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such

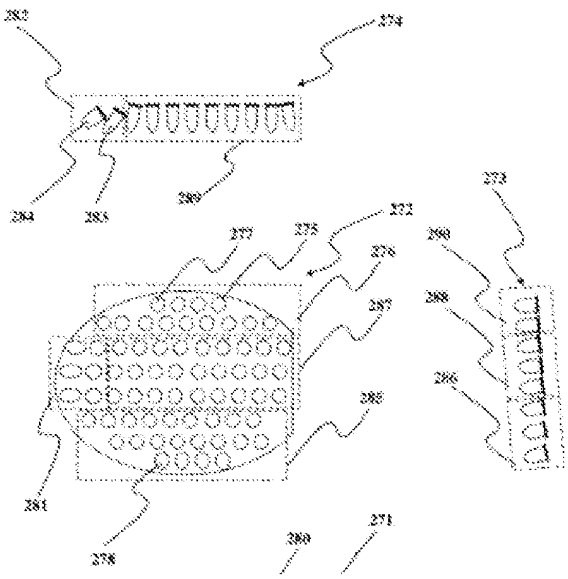
	changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.	**51:51-56** At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
60. (New) The illuminating device of claim 58, wherein the identification of the upcoming road curvature	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous

is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.	road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
61. (New) The illuminating device of claim 58, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.

62. (New) The illuminating device of claim 56, further including one or more optical control elements to control light emitted from one or more of the LEDs.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
63. (New) The illuminating device of claim 62, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
64. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**
a structure for incorporating illuminating device elements, wherein	**Claim 6 of the '551 Patent**

the structure comprises a motor vehicle;	**Fig. 15 (bottom):**  **53:45-54:47** Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to

	cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the	**Claim 6 of the '551 patent**

structure, each headlamp including at least one of the LEDs and in communication with a power source;	**Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not

	necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **17:3-16** As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**

one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of another vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. 25:53-67 Sensors 8 include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may

	be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
select a first cluster of the LEDs having light associated therewith that is directed towards the other vehicle based at least in part on first data from one or more of the sensors indicating a first position associated with the other vehicle;	**53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown

by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

52:27-42

A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the

pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings

	which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
control a first change to one or more characteristics of the light associated with the first cluster of the LEDs that is directed towards the other vehicle, that diminishes glare to a driver of the other vehicle when the other vehicle is at the first position;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand. The digital headlamp solves this problem by automatically sensing the angle of the headlamp assembly and will employ in real time only the properly aimed light sources to illuminate so as not to glare oncoming traffic **52:54-53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to

determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

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, yet not blind oncoming traffic due to the narrow beam.

22:14-22

In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting.

45:27-44

In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the

luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications

	which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
select a second, different cluster of the LEDs having light associated therewith that is directed towards the other vehicle based at least in part on second, subsequent data from one or more of the sensors indicating a second, subsequent position associated with the other vehicle; and	**53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

	52:27-42 A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles. **45:45-57** In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
control a second, subsequent change, to one or more characteristics of the light that is subsequently directed	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and

towards the other vehicle, that diminishes glare to the driver of the other vehicle when the other vehicle is at the second position.	spatial distribution of intensity and spectral distribution for the viewing task at hand. The digital headlamp solves this problem by automatically sensing the angle of the headlamp assembly and will employ in real time only the properly aimed light sources to illuminate so as not to glare oncoming traffic **19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand. The digital headlamp solves this problem by automatically sensing the angle of the headlamp assembly and will employ in real time only the properly aimed light sources to illuminate so as not to glare oncoming traffic **52:54 - 53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming

vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

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, yet not blind oncoming traffic due to the narrow beam.

22:14-22

In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and

	generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

65. (New) The illuminating device of claim 64, wherein:	
the first data or second data includes image data;	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.
at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.

of the respective cluster to a non-emitting state;	
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs; and	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the light that is directed or subsequently directed towards the other vehicle is determined based at least in part on known directionality of light emitted by the respective first or second cluster exiting the at least one headlamp.	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
66. (New) The illuminating device of claim 64, wherein the	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other

memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:	features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
identify an upcoming road curvature along a road on which the motor vehicle is traveling; and	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.	**51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.

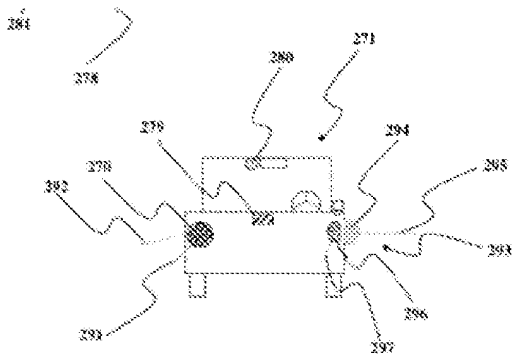
67. (New) The illuminating device of claim 66, wherein:	
at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED of the respective cluster to a non-emitting state;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

the light that is directed or subsequently directed towards the other vehicle is determined based at least in part on known directionality of light emitted by the respective first or second cluster exiting the at least one headlamp; and	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** **The direction of light exiting from the DLF as a whole** or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other

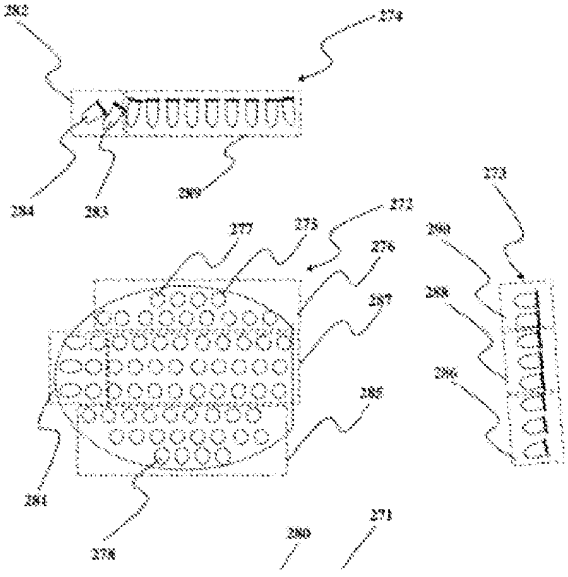
	radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
68. (New) The illuminating device of claim 66, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

pattern is based at least in part on the map data.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are

	deemed to be covered by the invention without departing from the spirit or scope of the following claims.
69. (New) The illuminating device of claim 66, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
70. (New) The illuminating device of claim 64, further including one or more optical control elements to control light emitted from one or more of the LEDs.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.

71. (New) The illuminating device of claim 70, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
72. (New) An illuminating device having automatic control of the light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**
a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	**Claim 6 of the '551 Patent** **Fig. 15 (bottom):** 

	53:45-54:47 Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In

	one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Claim 6 of the '551 patent** **Fig. 15 (top):** 

53:13-37

In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

17:3-16

As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes

	of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other elements of the illuminating device elements;	**Claim 6 of the '551 patent**
one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or

illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored

arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …
memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.

determine a target based on first data from one or more of the sensors;	**45:45-67** In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. It is to be understood that in a theater lighting application there is no need for a preprogrammed moving light using motors to change position. Instead a fixed DLF or ADLF with multiple light sources powers the necessary light sources to illuminate the performer as he or she moves about the stage. This actually is similar to the banks of shuttered lights used in present day stage lighting. Only now the digital aspect of discrete multiple light sources allowing for a smooth transition of aimings with instantaneous control of almost infinite variation of spectrum and intensity is accomplished. **50:37-56** The digital lighting concept is extended to transportation vehicle applications. A headlamp for an automobile uses multiple light sources based on electro luminescence of semiconductor junctions. The proposed unique approach is to combine the lighting engineering function i.e. the correct light distribution, color

spectrum and level necessary for the visual task at hand into the lamp such that the digital lamp obviates the need for additional light controls and fixtures. The digital electronic lamp utilizes ⅓ the energy and has over 100,000 hours lifetime versus 2000 for an automotive incandescent lamp and can be rapidly switched on and off without deleteriously affecting lifetime. (Quite the opposite, off time is not part of the lifetime). The multiple light-source, digital device, is an electronic headlight which provides the driver with the correct aiming, illumination level and distribution (e.g. parking lights, low beam, high beam, lighting around curves and corners) based on input from the vehicle's speed, steering wheel position, turn signal indicator and detection of approaching headlights.

52:62-53:4

Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

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, yet not blind oncoming traffic due to the narrow beam.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating,

	night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. 95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in tbe art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
determine a first target location based on the first data;	52:27-42 A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal

direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered

	as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
select a cluster of the LEDs having light associated therewith that is directed at the target, determined based on the first target location;	**53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location

within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.

52:27-42

A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and

	construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
vary illumination provided to the target by the selected cluster, relative to illumination provided to areas laterally adjacent to the target and provided by at least one LED different from LEDs in the selected cluster; and	**52:54-53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam. **22:14-22:**

	In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting. 45:27-44 In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
maintain a variance of illumination provided to the target relative to the laterally adjacent areas, when subsequent data	**45:45-67** In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a

from one or more of the cameras indicates a change in position of the target relative to the motor vehicle, by repeating the determination of target location, selection of the cluster and variance to illumination provided to the target, relative to the laterally adjacent areas, based on the subsequent data.	target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. It is to be understood that in a theater lighting application there is no need for a preprogrammed moving light using motors to change position. Instead a fixed DLF or ADLF with multiple light sources powers the necessary light sources to illuminate the performer as he or she moves about the stage. This actually is similar to the banks of shuttered lights used in present day stage lighting. Only now the digital aspect of discrete multiple light sources allowing for a smooth transition of aimings with instantaneous control of almost infinite variation of spectrum and intensity is accomplished. **51:59-65** Additional features include an optional concentrated flashlight type of beam to illuminate distant overhead and roadside signs, which due to the narrow directed beam will not blind oncoming traffic. Image recognition via a camera will allow the beam to follow the retroreflective sign as the vehicle moves or the signs will be provided with a special marker for this purpose. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of

	lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
73. (New) The illuminating device of claim 72, wherein:	
the variation of illumination provided to	**19:26-30**

the target includes variation in at least one of color or intensity or at least a change of at least one LED of the selected cluster to a non-emitting state;	The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the light directed at the target is determined based at least in part on known directionality of light emitted by the first cluster exiting from the at least one headlamp; and	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as

	reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

at least one of the first data or the subsequent data includes image data.	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.
74. (New) The illuminating device of claim 72, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.	**51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
75. (New) The illuminating device of claim 74, wherein:	
the variation of illumination provided to	**19:26-30**

the target includes variation in at least one of color or intensity or at least a change of at least one LED of the selected cluster to a non-emitting state;	The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
the selected cluster includes a plurality of the LEDs and the selected cluster includes non-contiguous LEDs;	**53:27-37** The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.
the light directed at the target is determined based at least in part on known directionality of light emitted by the first cluster exiting from the at least one headlamp, and	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as

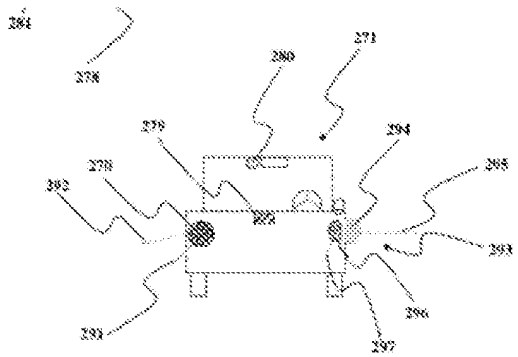
	reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.	**51:51-56** At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
76. (New) The illuminating device of claim 74, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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

pattern is based at least in part on the map data	the road and environmental factors. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
77. (New) The illuminating device of claim 74, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
78. (New) The illuminating device of claim 72, further including	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as

one or more optical control elements to control light emitted from one or more of the LEDs.	reflective surfaces and or refractors, and may be electronically variable optical elements.
79. (New) The illuminating device of claim 78 wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
80. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**
a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	**Claim 6 of the '551 Patent**

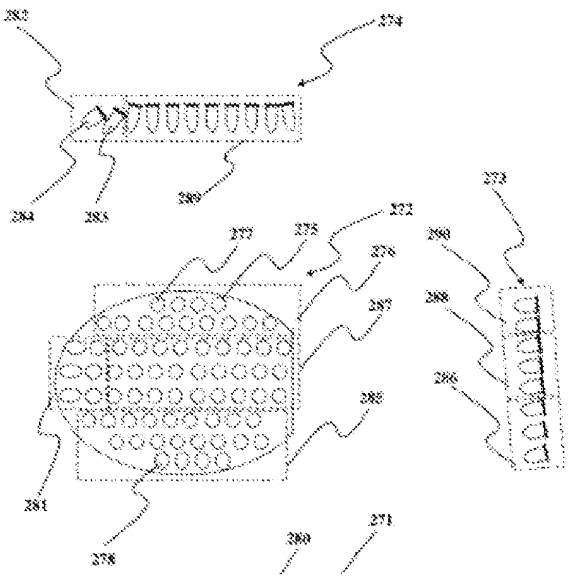
Fig. 15 (bottom):



53:45-54:47

Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to

	cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the	**Claim 6 of the '551 patent**

structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not

	necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **17:3-16** As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**

one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture camera data indicating a target ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may

	be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.
identify, based on data received from one or more of the sensors, a plurality of positions associated with the target as the target moves relative to the motor vehicle; and	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

	95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
change, responsive to the positions associated with the target, first light associated with one or more LEDs aimed toward at least a portion of the target, relative to second light associated with other one or more of the LEDs aimed laterally adjacent the target on either side, as the target moves relative to the motor vehicle.	52:27-42 A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.

45:45-57

In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

52:54-53:4

Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout.

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, yet not blind oncoming traffic due to the narrow beam. **22:14-22** In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting. **45:27-44** In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be

used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.

51:59-65

Additional features include an optional concentrated flashlight type of beam to illuminate distant overhead and roadside signs, which due to the narrow directed beam will not blind oncoming traffic. Image recognition via a camera will allow the beam to follow the retroreflective sign as the vehicle moves or the signs will be provided with a special marker for this purpose.

1:25-36

The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications.

95:3-14

There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention

	will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
	51:43-57 Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
81. (New) The illuminating device of claim 80, wherein:	

the data includes image data;	**52:27-42** A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select a first cluster of LEDs, associated with the first light, for the change, based at least in part on known aimings of the first light associated with the first	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.

cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and	**1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the change to emission of the one or more LEDs aimed towards the at least the portion includes a	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and

change to intensity or color or a change of at least one of the LEDs to a non-emitting state.	spatial distribution of intensity and spectral distribution for the viewing task at hand.
82. (New) The illuminating device of claim 80, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
identify an upcoming road curvature along a road on which the motor vehicle is traveling; and	**51:43-47** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand.
accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.	**51:43-56** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. In these systems the light distribution

	pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
83. (New) The illuminating device of claim 82, wherein:	
the change to emission of the one or more LEDs aimed towards the at least the portion includes a change to intensity or color or a change of at least one of the LEDs to a non-emitting state;	**19:26-30** The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select a first	**45:52-57** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room.

cluster of LEDs, associated with the first light, for the change, based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are

	deemed to be covered by the invention without departing from the spirit or scope of the following claims.
the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.	**51:51-56** At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location.
84. (New) The illuminating device of claim 82, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At any

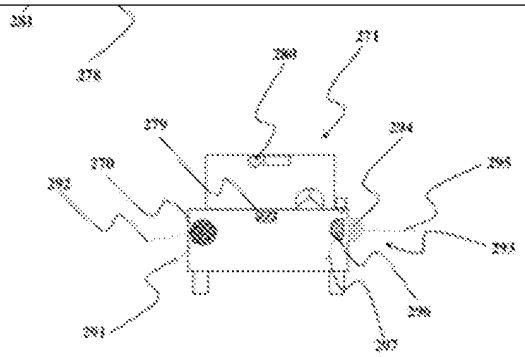
adaptation of the light pattern is based at least in part on the map data.	instant in time the intensity, spectrum and beam pattern of the headlamp may be varied as a function of the drivers intent, lay of the road and environmental factors. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.
85. (New) The illuminating device of claim 82, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.	**51:43-57** Present advances in automobile lighting include Adaptive Frontal-lighting Systems which aid in seeing around curves and other features in the road. In these systems the light distribution pattern and color spectrum will be changed according to the instantaneous road conditions at hand. Thus, the headlamp now has much more flexibility than the high beam/low beam variation of today. At 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. A GPS system on the car may also let the headlamps system know of curves up ahead, one way traffic and others factors such the headlamp may be operated in the optimal mode at that instantaneous location. With sensors sensitive to environmental surroundings such as ambient light, fog or snow conditions etc. lighting can be adapted to the optimal operating regime.

86. (New) The illuminating device of claim 80, further including one or more optical control elements to control light emitted from one or more of the LEDs.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.
87. (New) The illuminating device of claim 86, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.	**25:5-9** The direction of light exiting from the DLF as a whole or from each SLS individually is controllable by optical elements **6**, such as reflective surfaces and or refractors, and may be electronically variable optical elements.

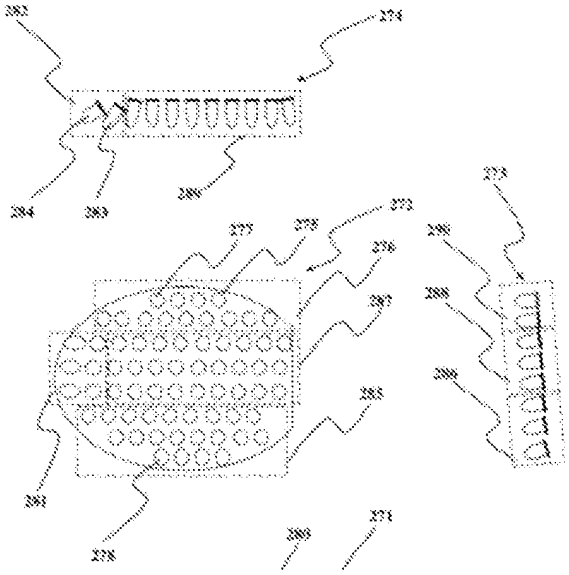
Exhibit OTH-E

Industry Praise Nexus Support

Claims – 9,955,551	112 Support	Industry Praise
Claim 6		
An illuminating device having automatic control of the light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10, PR Newswire at 1, emphasis added.) *See* Ex. OTH-A, "Stam Decl." at ¶107-108.
a structure for incorporating illuminating device elements;	**Claim 6 of the '551 Patent** **Fig. 15 (bottom):**	The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. (Ex. 10 at 1, emphasis added.) *See* Ex. OTH-A at ¶107, 109.

	 **53:45 – 54:47** Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the	

	vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with	

	fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.	
one or more light sources incorporated in the structure and in communication with a power source;	**Claim 6 of the '551 patent** **Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex.10 at 1, emphasis added.) A POSITA "would readily understand that such an automatically adjustable system would include

	such as an LED 275 with specific location within the cluster 276 has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED 277 at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster 278 which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.	individually controllable LEDs in communication with a power source." *See* Ex. OTH-A at ¶107, 110.

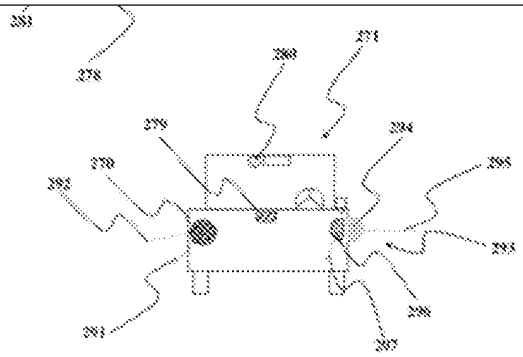
	17:3-16 As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.	
electronic circuitry apparatus for the controlled powering of the light source and other illuminating device elements;	**Claim 6 of the '551 patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time

		traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis added.) The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* "[F]rom the described functionality, it's clear that the praise is directed to an illuminating device, including *electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements*." (Ex. OTH-A at ¶107,111.)
one or more cameras placed on the structure for detecting coordinate-specific information about the illuminated area, said camera in communication with	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from	"The **new Matrix Beam system combines a front camera**, high-performance software and "intelligent lighting" technology **to recognize cars that are being followed as well as**

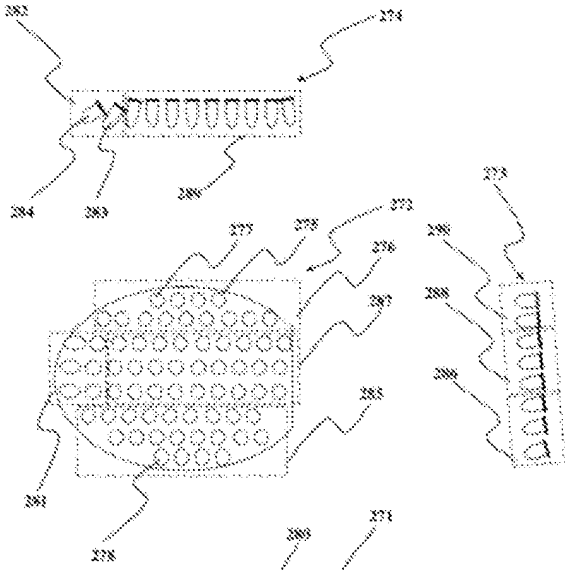
power and control device elements;	manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. 25:53-67 Sensors 8 include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.	**oncoming traffic**." (Ex. 10 at 1, emphasis added 1.) "[F]rom this sentence, it's clear to a person skilled in the art that the industry praise is directed to an illuminating device that includes the details of the camera sensor limitation." (Ex. OTH-A at ¶107, ¶112.)

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.	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS.	A leader in automotive lighting and electronics, HELLA's "glare-free high-beam" headlights use **individually controlled LEDs that adjust automatically to real-time traffic conditions** to reduce glare for other drivers. (Ex. 10 at 1, emphasis added.) **The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic**. *Id* **The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions**." *Id.* "[F]rom the above sentences, and the inherent knowledge possessed by a person skilled

	53:48-50 … the external controller 279 which receives traffic data from sensors 280 …	in the art, it's clear that the industry praise is directed to an illuminating device that includes the details of the controller limitation, wherein the controller processes information from the camera". (Ex. OTH-A at ¶107, 113.)
Claim 24 (New)		
An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis added.) *See* Ex. OTH-A at ¶107-108.
a structure for incorporating illuminating device elements, wherein the	**Claim 6 of the '551 Patent** **Fig. 15 (bottom):**	The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or

structure comprises a motor vehicle;	 **53:45 – 54:47** Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the	switching on and off light sources based on traffic conditions. (Ex. 10 at 1, emphasis added.) *See* Ex. OTH-A at ¶107, 109.

	vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with	

	fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.	
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Claim 6 of the '551 patent** **Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis added.) The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light

	such as an LED 275 with specific location within the cluster 276 has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED 277 at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster 278 which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous.	sources based on traffic conditions. *Id.* A POSITA "would readily understand that such an automatically adjustable system would include individually controllable LEDs in communication with a power source". *See* Ex. OTH-A at ¶107.

	17:3-16 As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.	
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time

		traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis addedp. 1.) The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* "[F]rom the described functionality, it's clear that the praise is directed to an illuminating device, including *electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements*." (Ex. OTH-A at ¶107, ¶111.)
one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be	

	broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.	
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53 – 67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the	"The **new Matrix Beam system combines a front camera**, high-performance software and "intelligent lighting" technology **to recognize cars that are being followed as well as oncoming traffic**." (Ex. 10 at 1, emphasis added.) ""[F]rom this sentence, it's clear to a person skilled in the art that the industry praise is directed to an illuminating device that includes the details of the camera sensor limitation." (Ex. OTH-A at ¶107, ¶112.)

	intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.	
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out	A leader in automotive lighting and electronics, HELLA's "glare-free high-beam" headlights use **individually controlled LEDs that adjust automatically to real-time traffic conditions** to reduce glare for other drivers. (Ex. 10 at 1, emphasis added.) **The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic**. *Id.*

	intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …	**The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions**. *Id.* '[F]rom the above sentences, and the inherent knowledge possessed by a person skilled in the art, it's clear that the industry praise is directed to an illuminating device that includes the details of the controller limitation, wherein the controller processes information from the camera". (Ex. OTH-A at ¶107, ¶.)
memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and	The new Matrix Beam system combines a front camera, **high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic**. (Ex. 10 at 1, emphasis added.)

	maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.	The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* **Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** *Id.* From the above sentences and the inherent knowledge of a person skilled in the art, "in order to implement the 'high performance software' it's clear that *memory storing instructions* would necessarily be provided. (Ex. OTH-A at ¶107, ¶114).
determine first coordinates corresponding to an other vehicle, based on	**45:53-55** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light	"[F]rom the above sentences and the inherent knowledge of a person skilled in the art, it's clear that the industry praise is directed to an

the coordinate-specific information;	sources with aimings which will project light at the speaker as the speaker move about the room. **12:5-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **52:54-65** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such	illuminating device that determines the position of at least one other vehicle". (Ex. OTH-A at ¶107, ¶115).

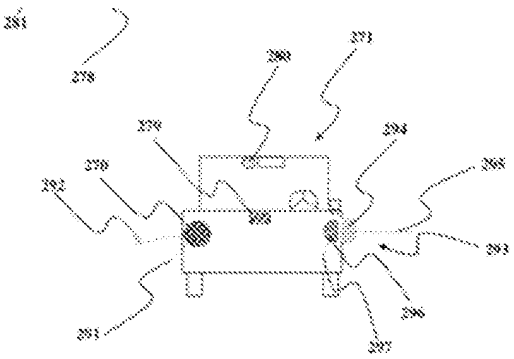
	a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.	
select a cluster of the LEDs that emit light toward at least a	**45:53-55** The controller **195**, based on the camera input runs the pattern recognition routines,	The new Matrix Beam system combines a front camera, high-performance software

portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates;	derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **52:54-65** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night	and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic. (Ex. 10 at 1, emphasis added.) The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* **Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** *Id.* From the above sentences and the inherent knowledge of a person skilled in the art, "an illuminating device that includes "individually controlled LEDs" necessarily selects the LEDS to be aimed based on the position of the

	vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.	detected vehicle, per the *select a cluster* limitation". (Ex. OTH-A at ¶107, ¶116).

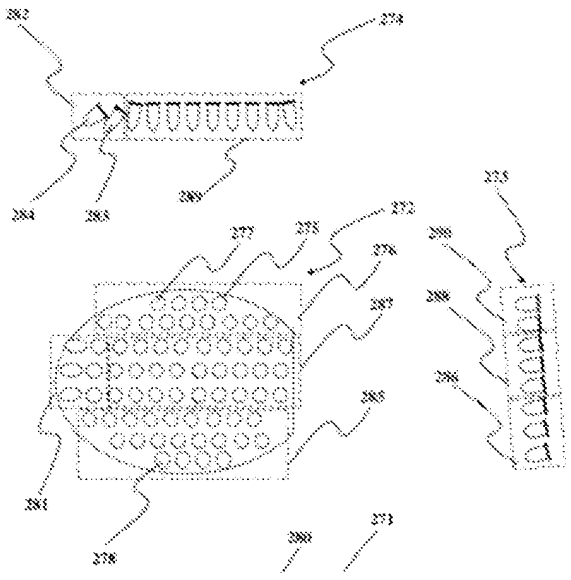
change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle.	**45:53-55** The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **52:54-65** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. **1:25-36** The present invention is in the field of radiation producing devices. More	The two-or-more dark zones with 'light in-between' correspond to the "first coordinates" and "preserved area of illumination" to prevent glare to a driver of the other vehicle, which as the article states provides a safer driving experience. (Ex. 10 at 1, emphasis added.) "[F]rom the above sentences it would be clear to a person skilled in the art that the industry praise description of an illuminating device with "two or more dark zones with 'light-in-between" to maximize visibility, corresponds to the above-identified claim limitation, providing reduced illumination in the dark zones relative to the illumination on both sides of the dark zone." *See,* OTH-A at ¶107, ¶117.

	particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. 95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention	

	without departing from the spirit or scope of the following claims.	
Claim 32		
An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis added.) *See* Ex. OTH-A at ¶107-108.
a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	**Claim 6 of the '551 Patent** **Fig. 15 (bottom):** 	The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. (Ex. 10, PR Newswire at 1, emphasis added.) *See* Ex. OTH-A at ¶107, ¶109.

	53:45 – 54:47 Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** … a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to	

	cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses	

	the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.	
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Claim 6 of the '551 patent** **Fig. 15 (bottom):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers" The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. (Ex. 10 at 1, emphasis added.) A POSITA "would readily understand that such an automatically adjustable system would include

	one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED 277 at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster 278 which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **17:3-16** As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in	individually controllable LEDs in communication with a power source". *See* Ex. OTH-A at ¶107, ¶110.

	response to the signal. Thus, the term "light source" should be understood to include light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.	
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis added.) The system automatically adjusts a **car's headlamps** to

		deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* From the described functionality, "it's clear that the praise is directed to an illuminating device, including *electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements*." (Ex. OTH-A at ¶107, ¶111.)
one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.	
one or more sensors, including one or more cameras, placed on the structure for detecting	**Claim 6 of the '551 patent** **25:34-42**	"The **new Matrix Beam system combines a front camera**, high-performance software and "intelligent

coordinate-specific information about the illuminated area and positioned to capture an image of at least one target, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array	lighting" technology **to recognize cars that are being followed as well as oncoming traffic**." (Ex. 10 at 1, emphasis added.) "[F]rom this sentence, it's clear to a person skilled in the art that the industry praise is directed to an illuminating device that includes the details of the camera sensor limitation." (Ex. OTH-A at ¶107, ¶112.)

	and may be monochromatic or color as in a monochromatic or digital camera. Such arrays are readily available in mega-pixel resolution.	
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors 8, or from manual control button 9 and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are	A leader in automotive lighting and electronics, HELLA's "glare-free high-beam" headlights use **individually controlled LEDs that adjust automatically to real-time traffic conditions** to reduce glare for other drivers. (Ex. 10 at 1, emphasis added.) **The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic**. (Ex. 10, at 1, emphasis added.) **The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light**

	checked against the stored parameters and the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …	**sources based on traffic conditions**. *Id.* "[F]rom the above sentences, and the inherent knowledge possessed by a person skilled in the art, it's clear that the industry praise is directed to an illuminating device that includes the details of the controller limitation, wherein the controller processes information from the camera". (Ex. OTH-A at ¶107, ¶113.)
memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47**	The new Matrix Beam system combines a front camera, **high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic.** (Ex. 10 at 1, emphasis added.) The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light

	The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently such that each lamp performs its functions separately.	sources based on traffic conditions. *Id.* **Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** *Id.* "From the above sentences, it's clear that the industry praise is directed to an illuminating device that includes the '*memory storing instructions*' limitation". (Ex. OTH-A at ¶107, ¶114.)
create a beam of diminished illumination illuminating at least a portion of the at least one target with non-glaring illumination, created within a broader field of illumination having different intensity than the beam, by one or more changes to	**52:54 - 53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic.	

characteristics of first light of a cluster of the LEDs providing the first light directed at the at least a portion and creating the beam, the beam diminished in intensity relative to the broader field of illumination illuminating at least above and on both sides of the beam; and	Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam. **22:14-22** In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting.	

	22:26-48 In another example of prior art practice a table lamp for reading is provided with a shade. The shade is there to partially redirect the light onto the book and also prevent direct, glaring, rays from the lamp used for general lighting from reaching the reader's eyes. According to the present invention, instead of having a glaring lamp producing light which is then made non-glaring by a shade at a loss in excess of 50% the LF is built such the amounts of light directed downward at useful angles and the amount of light directed upward are in the correct ratio. The surface area, from which discomfort-glare causing rays exit, is designed such that the luminous exitance is within recommended UGR levels for home use. The fixture has no need for a shade to protect from glare, the glare was never produced at those angles to begin with due to proper geometric design. To get the desired luminous exitance expressed in terms of lumen per sq. meter or luminance in terms of candela per sq. meter, the light exiting the source of specific intensity at angles which normally reach the room occupant's eyes, is spread over an area such that the exiting light is non-glaring. These lighting design parameters serve as the product specification and are incorporated	

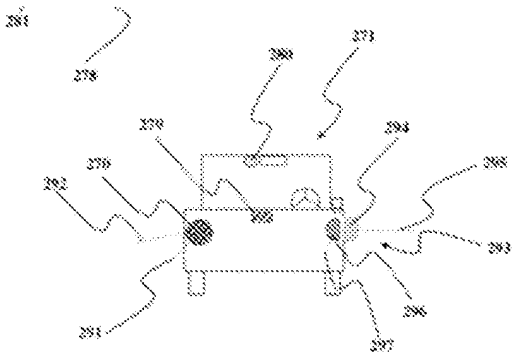
	into the initial design. There is no need to add on components to achieve correct lighting. 45:27-44 In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces.	

	1:25-36 The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such	

	changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.	
follow, based at least in part on data from one or more of the cameras, the at least one target with the diminished illumination as the at least one target changes location relative to the motor vehicle.	**45:45-67** In another embodiment using the camera **197**, the controller **195** is instructed to identify and track a roving speaker during a video presentation. A signaling device is used by the speaker to allow the pattern recognition program to initially lock-on and recognize a target attribute as is known in the art of object tracking. The signaling device can be a laser light pointer **202** aimed at the camera or a hand held remote control **201** in communication with the camera vision system. The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. It is to be understood that in a theater lighting application there is no need for a preprogrammed moving light using motors to change position. Instead a fixed DLF or ADLF with multiple light	"The **new Matrix Beam system combines a front camera**, high-performance software and "intelligent lighting" technology **to recognize cars that are being followed as well as oncoming traffic**." (Ex. 10, at 1, emphasis added.) **Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** *Id* A POSITA would readily understand that the high performance software that successfully recognized cars that are being followed,

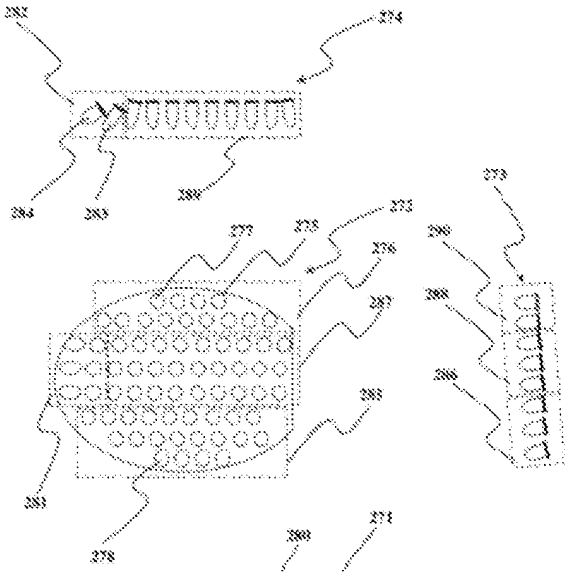
	sources powers the necessary light sources to illuminate the performer as he or she moves about the stage. This actually is similar to the banks of shuttered lights used in present day stage lighting. Only now the digital aspect of discrete multiple light sources allowing for a smooth transition of aimings with instantaneous control of almost infinite variation of spectrum and intensity is accomplished. **51:59-65** Additional features include an optional concentrated flashlight type of beam to illuminate distant overhead and roadside signs, which due to the narrow directed beam will not blind oncoming traffic. Image recognition via a camera will allow the beam to follow the retroreflective sign as the vehicle moves or the signs will be provided with a special marker for this purpose. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered	would necessarily follow the target to result in the "dark zones". (Ex. OTH-A at ¶107, ¶115, ¶117.)

	as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. 95:3-14 There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.	
Claim 56		

An illuminating device having automatic control of light provided to an illuminated area comprising:	**Claim 6 of the '551 Patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers" (Ex. 10 at 1, emphasis added.) *See* OTH-A at ¶107-¶108
a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	**Claim 6 of the '551 Patent** **Fig. 15 (bottom):**  **53:45 – 54:47**	The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. (Ex. 10at1, emphasis added.) *See* Ex. OTH-A at ¶107, ¶109

	Thus when following another vehicle, assuming, as drivers have reported, that they find yellow incandescent colored headlamps less offending than the HID blue-white color, the external controller **279** which receives traffic data from sensors **280** ... a cluster **281** would be used to illuminate around a corner. Thus when the turn indicator has been selected or the steering wheel has been rotated by the driver, the DLF headlamp is powered by the controller to illuminate sideways at angles which according to the speed of travel is correct. (A driver can't make a 90-degree turn traveling 90 kph but from a stop, the turn may be around a corner.) In a preferred embodiment a multitude of LEDs in **281** are differently aimed in top view **274** showing the top view of the cluster **282** with SLS **283** angled less outwards and SLS **284** angled more outward with the forward aiming (distance ahead of the vehicle) of the more angled SLS **284**, closer in for illuminating sharp turn, than that of the less angled SLS **283** for a shallow curve. Side sectional view **273** shows a general downward aiming with SLSs of front view **272** cluster **285** corresponding to cluster **286** shown from the side. The cluster **286** is the most angled downward such as for a slow driving as in a parking	

	light type of application where the idea is not to cause glare yet be seen. The parking light function can also be done with higher angled LEDs by just lowering the intensity to very low non-glaring intensities. Cluster **287** of the front view would be the main illuminating workhorse and is shown in side view **273** as angled SLSs in cluster **288** and top view **274** as cluster **289**. The top cluster **276** shown in side view **273**, as **290** would perform alone or in tandem with part of **287** the high beam lighting function… In one embodiment the digital headlamp carries out all the functions in a single unit **270**. SLSs have different locations and aimings **291** and **292** to carry out the functions. In another embodiment **293** the spotlight sign illuminating function or corner lighting function is in a separate package **294** with its aiming **295**. The low and high beam lighting is accomplished with fixture **296** and its general aiming **297**. The separate units may be dictated by design or sales considerations and yield more flexibility but are within the scope of the overall integral digital lamp headlight device. The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently	

	such that each lamp performs its functions separately.	
a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;	**Claim 6 of the '551 patent** **Fig. 15 (top):**  **53:13-37** In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis added.) The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* A POSITA "would readily understand that such an automatically adjustable system would include individually controllable

	spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **17:3-16** As used herein, the term "light source", LED or "solid state light source" means any system that is capable of receiving an electrical signal and producing light in response to the signal. Thus, the term "light source" should be understood to include	LEDs in communication with a power source". *See* Ex. OTH-A at ¶107, 110.

	light emitting diodes of all types, light emitting polymers, semiconductor dies that produce or emanate light in response to current, organic LEDs, electro-luminescent strips, and other such systems. Incandescent and discharge light sources are also included and multiples of incandescent and discharge light sources also provide a digital luminaire. In an embodiment, a "light source" may refer to a single light emitting diode package including multiple semiconductor LED dies that are individually controlled.	
electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements;	**Claim 6 of the '551 patent**	HELLA "has won the prestigious 2014 Automotive News PACE Award for its industry-first adaptive LED Matrix Beam technology. . . HELLA's "glare-free high-beam" **headlights use individually controlled LEDs that adjust automatically** to real-time traffic conditions to reduce glare for other drivers." (Ex. 10 at 1, emphasis added. 1.) The system automatically adjusts a **car's headlamps** to deliver "glare free" illumination, dimming or

		switching on and off light sources based on traffic conditions. *Id.* From the described functionality, "it's clear that the praise is directed to an illuminating device, including *electronic circuitry apparatus for the controlled powering of the LEDs and other of the illuminating device elements"*. (Ex. OTH-A at ¶107, ¶111.)
one or more processors;	**18:23-29** In a preferred embodiment the DLF is provided with an onboard controller. The controller may be a computer board, embedded device, a Digital Signal Processor, etc. In general, the term "logical controller, controller or computer" can be broadly defined to encompass any device having control circuitry or a processor which executes instructions from a memory medium.	
one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the	**Claim 6 of the '551 patent** **25:34-42** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives	"The **new Matrix Beam system combines a front camera**, high-performance software and "intelligent lighting" technology **to recognize cars that are**

illuminated area and positioned to capture an image of at least one other vehicle ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;	input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. **25:53-67** Sensors **8** include any of the following: light, temperature and motion detection devices. Two types of optical detection sensors may be used: A photo detector with specific spectral sensitivity to detect a specific color. For example a standard red, blue and green set which would then indicate how "white" the light is. Alternately, a wide spectrum photo detector that irrespective of color measures the intensity of each excited die as it is test fired, based on the eye visual sensitivity curve. The optical sensor may be lensed and capable of forming an image, that is a camera and the detector may be a detector array of photodiode pixels. The detector array may be a CMOS or CCD VSLI array and may be monochromatic or color as in a monochromatic or digital camera. Such	**being followed as well as oncoming traffic**." (Ex. 10, at 1, emphasis added.) "[F]rom this sentence, it's clear to a person skilled in the art that the industry praise is directed to an illuminating device that includes the details of the camera sensor limitation." (Ex. OTH-A at ¶107, ¶112.)

	arrays are readily available in mega-pixel resolution.	
a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	**Claim 6 of the '551 patent** **25:34-52** In a preferred embodiment the DLF contains logic control electronics unit 7. Logic control electronics unit, 7, receives input and/or feedback from motion, intensity and/or spectral sensors **8**, or from manual control button **9** and increases or decreases or turns on or shuts off the power to one or more of the SLS to effect the desired change. That is, the control logic unit 7 has stored parameters for intensity and spectral distribution and operates the MSLS lamp within the predefined range. The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. Measured parameters are checked against the stored parameters and	A leader in automotive lighting and electronics, HELLA's "glare-free high-beam" headlights use **individually controlled LEDs that adjust automatically to real-time traffic conditions** to reduce glare for other drivers. (Ex. 10 at 1, emphasis added.) **The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic.** *Id.* **The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions**." *Id.*

	the control circuitry adjusts the power to SLS. **53:48-50** … the external controller **279** which receives traffic data from sensors **280** …	"From the above sentences, and the inherent knowledge possessed by a person skilled in the art, it's clear that the industry praise is directed to an illuminating device that includes the details of the controller limitation, wherein the controller processes information from the camera." (Ex. OTH-A at ¶107, ¶113.)
memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:	**25:42-50** The control unit may include a DSP or computer with storage media, computer algorithms, signal input and output electronics, analog to digital converters, and communications elements to carry out intensity, distribution, dimming and color balance control. Computer algorithms and instruction sets 7A are induced by the logical controller to manipulate data, calculate results generate output signals and maintain the operating parameters within the specifications. **54:45-47** The controller **279** will addresses the power supply of each DLF headlamp **270**, **296** and **294** independently	The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic. (Ex. 10 at 1, emphasis added.) The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* **Individually controlled LEDs also provide two or**

	such that each lamp performs its functions separately.	**more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** (Ex. 10 at 1, emphasis added.) "From the above sentences and the inherent knowledge of a person skilled in the art, in order to implement the 'high performance software' it's clear that *memory storing instructions* would necessarily be provided." (Ex. OTH-A at ¶107, ¶114).
determine, based on data from one or more of the sensors, a vertical and horizontal position associated with the at least one other vehicle;	52:27-42 A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including	The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic. (Ex. 10 at 1, emphasis added.) The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or

	horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles.	switching on and off light sources based on traffic conditions. *Id.* **Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** *Id.* "[F]rom the above sentences and the inherent knowledge of a person skilled in the art, it's clear that the industry praise is directed to an illuminating device that determines the position of at least one other vehicle." (Ex. OTH-A at ¶107, ¶115).
select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and	52:27-42 A possible control system for such purposes is described in U.S. Pat. No. 6,281,632 by Stam, et-al from Aug. 28, 2001 titled: A Continuously variable headlamp control incorporated herein by reference. The patent describes how continuously variable headlamps offer greater flexibility for roadway illumination but offer challenges in	The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic. (Ex. 10 at 1, emphasis added.)

	automatic control design. Each continuously variable headlamp has an effective illumination range varied by changing at least one parameter from a set including horizontal direction aimed, vertical direction aimed, and intensity emitted. Stam discloses a system for automatically controlling continuously variable headlamps on a controlled vehicle includes an imaging system capable of determining lateral and elevational locations of headlamps from oncoming vehicles and tail lamps from leading vehicles. **52:62 – 53:4** Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. 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, yet not blind oncoming traffic due to the narrow beam.	The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* **Individually controlled LEDs also provide two or more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** *Id.* "It is my opinion that, from the above sentences and the inherent knowledge of a person skilled in the art, an illuminating device that includes 'individually controlled LEDs' necessarily selects the LEDS to be aimed based on the position of the detected vehicle, per the *select a cluster* limitation." (Ex. OTH-A at ¶107, ¶116).

	45:52-57 The controller **195**, based on the camera input runs the pattern recognition routines, derives the coordinates and generates instructions to drive the specific light sources with aimings which will project light at the speaker as the speaker move about the room. **19:17-30** The basis of the invention is the use of a multitude of discrete light emitting sources ("digits") to generate light. The light control elements can be applied on a per junction basis or on a "white" color generating set grouping such as RGB or on a larger set which may be convenient for manufacturing or other color rendering considerations. The requirement for controllability is however, that the SLS output is definitive in relation to spectrum and spatial distribution. The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution, and spatial distribution of intensity and spectral distribution for the viewing task at hand.	

	53:13-37 In FIG. 16 a headlamp **270** of a land, sea or air vehicle **271** is shown in front view **272**, side view of a section **273** and top view of a section **274**. A discreet SLS light source such as an LED **275** with specific location within the cluster **276** has a specific spatial light distribution, color wavelength and aiming relative to the vehicle, such as straight ahead, and or downwards and or off towards the right or left. The SLS may have one junction and be monochromatic or have a many junctions and provide a wide spectral power distribution and the power to the SLS may be varied. An SLS can also be a "white" LED. For example a typical "white" LED such as a Luxeon® white LED such as LXHL-XXXX will have a colder "bluish" 4,500K color temperature. LED **277** at a second location within the same cluster may have a similar or dissimilar aiming, wavelength and spatial light distribution. The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement. In general a cluster may be deemed a separate grouping due to a function it performs, either exclusively or in conjunction with other clusters or sub-clusters, such as high beam function versus	

	a second cluster **278** which may provide a parking light function. The same SLS may be used, albeit at different intensities, for both the above functions and thus clusters may overlap and be discontinuous. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of	

	the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.	
reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative to intensity of illumination on both sides of the first area at elevations common with the first area illuminated by a second cluster of the LEDs, by control of emission from the first cluster.	**50:37-56** The digital lighting concept is extended to transportation vehicle applications. A headlamp for an automobile uses multiple light sources based on electro luminescence of semiconductor junctions. The proposed unique approach is to combine the lighting engineering function i.e. the correct light distribution, color spectrum and level necessary for the visual task at hand into the lamp such that the digital lamp obviates the need for additional light controls and fixtures. The digital electronic lamp utilizes ⅓ the energy and has over 100,000 hours lifetime versus 2000 for an automotive incandescent lamp and can be rapidly switched on and off without deleteriously affecting lifetime. (Quite the opposite, off time is not part of the lifetime). The	The new Matrix Beam system combines a front camera, high-performance software and "intelligent lighting" technology to recognize cars that are being followed as well as oncoming traffic. (Ex. 10 at 1, emphasis added.) The system automatically adjusts a car's headlamps to deliver "glare free" illumination, dimming or switching on and off light sources based on traffic conditions. *Id.* **Individually controlled LEDs also provide two or**

	multiple light-source, digital device, is an electronic headlight which provides the driver with the correct aiming, illumination level and distribution (e.g. parking lights, low beam, high beam, lighting around curves and corners) based on input from the vehicle's speed, steering wheel position, turn signal indicator and detection of approaching headlights. **52:54 - 53:4** Additional features can include an optional very narrow flashlight type of beam. Present day LEDs come in very narrow aimings such as two half angle 8 degrees which may not be narrow enough (a 10 meter spread for 150 meters down the road which may be sufficiently aimed to the right) but with need, smaller angles are also feasible. Such a beam at the correct narrow aiming can continue to illuminate far ahead (in high beam) without blinding oncoming traffic. Analysis by a detector or an imaging system of the oncoming vehicles position (using its headlights for example) can be used to determine which exact aiming is the maximum allowable for any given traffic situation and road layout. Using color and pattern recognition techniques it is possible to determine what	**more dark zones with "light in-between," allowing continuous use of a vehicle's high-beams to maximize visibility and provide a safer driving experience.** *Id.* "[F]rom the above sentences, it would be clear to a person skilled in the art that the industry praise description of an illuminating device with "two or more dark zones with 'light-in-between" to maximize visibility, corresponds to the above-identified claim limitation, providing reduced illumination in the dark zones relative to the illumination on both sides of the dark zone." (Ex. OTH-A at ¶107, 117.)

	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, yet not blind oncoming traffic due to the narrow beam. **22:14-22** In a DLF it is possible to combine a task light having a very narrow "spot" beam at the correct aiming with a general area lighting "flood" beam into one fixture. The digital lighting fixture is positioned according to recommended lighting practice near a workstation and correctly oriented such that the DLF gives a wide (though still controlled, so as not to cause glare on a computer display) general illumination distribution as well as a narrow distribution aimed at the desktop for high intensity task lighting. **45:27-44** In a further ADLF intelligent lighting system improvement over prior-art practice, machine vision is used to control surrounding luminance. A prime example is an office application where a computer Visual Display Terminal is in use. This is an application where the quality of the	

	localized task lighting is important. Contrast plays a major role in seeing and glare plays a role in producing veiling reflections as causing fatigue. The correct illuminating solution involves the control of surrounding luminances. A prior art workstation design will include partition, carpet, ceiling and desk surface reflectance which reduce the luminance in the workers field of view. Using the ADLFs ability to recognize the computer screen chair, desk and surrounding floor and ceiling, the illuminance in lux on each element is varied to obtain the optimal luminance. That now allows any color scheme to be used by the interior designer on the work cell decor. The ADLF will control the luminance by varying the spatial light intensity distribution over the different surfaces. **1:25-36** The present invention is in the field of radiation producing devices. More particularly, the present invention is in the technical field of lighting fixtures. However, radiation used for headlamps, heating, night vision, UV or visible light curing, medical X-rays and other radiation uses are covered as well. General lighting fixtures otherwise known as luminaires will be used as the primary example while other irradiating	

	devices such as infrared heaters are covered as well. The invention relates to multiple light source illuminating devices intended to replace incandescent, fluorescent and HID luminaries in general and specialty lighting applications. **95:3-14** There has thus been shown and described, among other things, a multiple-source lighting technology which allows for the design and construction of illuminating devices. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention without departing from the spirit or scope of the following claims.	

Exhibit OTH-F
Side by Side Claim Comparison

Claim 6	Claim 24	Claim 32	Claim 40	Claim 48	Claim 56	Claim 64	Claim 72	Claim 80
An illuminating device having automatic control of the light provided to an illuminated area comprising:	24. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	32. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	40. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	48. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	56. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	64. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:	72. (New) An illuminating device having automatic control of the light provided to an illuminated area comprising:	80. (New) An illuminating device having automatic control of light provided to an illuminated area comprising:
a structure for incorporating illuminating device elements;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;	a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;
one or more light sources incorpo	a plurality of individually	a plurality of individually	a plurality of individually	a plurality of individually	a plurality of individually	a plurality of individually	a plurality of individually	a plurality of individually

rated in the structure and in communication with a power source;	*controllable LEDs light sources incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;*	*controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;*	*controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;*	*controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;*	*controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;*	*controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs and in communication with a power source;*	*controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;*	*controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;*
electronic circuitry apparatus for the controlled powering of the light	*electronic circuitry apparatus for the controlled powering of the light*	*electronic circuitry apparatus for the controlled powering of the LEDs*	*electronic circuitry apparatus for the controlled powering of the LEDs*	*electronic circuitry apparatus for the controlled powering of the LEDs*	*electronic circuitry apparatus for the controlled powering of the LEDs*	*electronic circuitry apparatus for the controlled powering of the LEDs*	*electronic circuitry apparatus for the controlled powering of the LEDs*	*electronic circuitry apparatus for the controlled powering of the LEDs*

source and other illuminating device elements;	source LEDs and other of the illuminating device elements;	and other of the illuminating device elements;	and other of the illuminating device elements;	and other of the illuminating device elements;	and other of the illuminating device elements;	and other of the illuminating device elements;	and other elements of the illuminating device elements;	and other of the illuminating device elements;
	one or more processors;	one or more processors;	one or more processors;	one or more processors;	one or more processors;	one or more processors;	one or more processors;	one or more processors;
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	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of another	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication	one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture camera data indicating a

element s;	*with power, and in commun ication with at least one of the one or more process ors;*	*one target, at least one of said cameras in commun ication with power, and in commun ication with at least one of the one or more process ors;*	*two other vehicles , at least one of said cameras in commun ication with power, and in commun ication with at least one of the one or more process ors;*	*with power, and in commun ication with at least one of the one or more process ors;*	*one other vehicle ahead of the motor vehicle, at least one of said cameras in commun ication with power, and in commun ication with at least one of the one or more process ors;*	*vehicle, at least one of said cameras in commun ication with power, and in commun ication with at least one of the one or more process ors;*	*with power, and in commun ication with at least one of the one or more process ors;*	*target ahead of the motor vehicle, at least one of said cameras in commun ication with power, and in commun ication with at least one of the one or more process ors;*
a controll er integrat ed with the structur e, in commun ication with the light source controll ing power circuitr y, said controll	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*	*a controll er, includin g at least one of the one or more process ors, integrat ed with the structur e via mountin g, in commun*

er arranged to processes [sp] the information communicated from the camera and automatically control the light provided to the illuminated area.	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information, communicated from the cameras and to automatically control the light provided to the illuminated area; and	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and	ication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and
	memory storing instructions that, when executed by one or more process	memory storing instructions that, when executed by one or more process	memory storing instructions that, when executed by one or more process	memory storing instructions that, when executed by one or more process	memory storing instructions that, when executed by one or more process	memory storing instructions that, when executed by one or more process	memory storing instructions that, when executed by one or more process	memory storing instructions that, when executed by one or more process

	ors of the controller, enable the controller to:	ors of the controller, enable the controller to:	ors of the controller, enable the controller to:	ors of the controller, enable the controller to:	ors of the controller, enable the controller to:	ors of the controller, enable the controller to:	ors of the controller, enable the controller to:	ors of the controller, enable the controller to:
	determine first coordinates corresponding to another vehicle, based on the coordinate-specific information;	create a beam of diminished illumination illuminating at least a portion of the at least one target with non-glaring illumination, created within a broader field of illumination having different intensity than the beam, by one or more changes to characteristics of first	determine a first cluster of the LEDs illuminating at least a first portion of a first other vehicle based at least in part on data from one or more of the sensors indicating a first position associated with the first other vehicle;	illuminate a portion of at least one object, indicated by data from at least one of the one or more sensors, by selecting a first cluster of the LEDs to emit first light directed towards a first area including the at least the portion of at least one object,	determine, based on data from one or more of the sensors, a vertical and horizontal position associated with the at least one other vehicle;	select a first cluster of the LEDs having light associated therewith that is directed towards the other vehicle based at least in part on first data from one or more of the sensors indicating a first position associated with the other vehicle;	determine a target based on first data from one or more of the sensors;	identify, based on data received from one or more of the sensors, a plurality of positions associated with the target as the target moves relative to the motor vehicle; and

		light of a cluster of the LEDs providing the first light directed at the at least a portion and creating the beam, the beam diminished in intensity relative to the broader field of illumination illuminating at least above and on both sides of the beam; and		*the first area determined based at least in part on the data, the first cluster selected based at least in part on known aimings of light associated with the first cluster determined to correspond to the first area, and the first light determined based at least in part on classifying the object based at least in part on the data;*				

	select a cluster of the LEDs that emit light toward at least a portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates; and	*follow, based at least in part on data from one or more of the cameras, the at least one target with the diminished illumination as the at least one target changes location relative to the motor vehicle.*	*diminish glaring illumination of the first other vehicle by a first change to one or more characteristics of first light of at least the first cluster;*	*and control light emitted from the first cluster directed towards the first area to be different in at least one emission characteristic, based on the first light determination, from second light emitted from a second, different cluster of the LEDs, directed towards one or more illuminated second areas at a common*	*select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and*	*control a first change to one or more characteristics of the light associated with the first cluster of the LEDs that is directed towards the other vehicle, that diminishes glare to a driver of the other vehicle when the other vehicle is at the first position;*	*determine a first target location based on the first data;*	*change, responsive to the positions associated with the target, first light associated with one or more LEDs aimed toward at least a portion of the target, relative to second light associated with other one or more of the LEDs aimed laterally adjacent the target on either side, as the target moves relative*

				elevation with the first area and laterally adjacent to the first area.				to the motor vehicle.
	change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a		determine a second, different cluster of the LEDs illuminating at least a second portion of a second other vehicle based at least in part on the data indicating a second position associated with the second other vehicle;		reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative to intensity of illumination on both sides of the first area at elevations common with the first area illuminated by a	select a second, different cluster of the LEDs having light associated therewith that is directed towards the other vehicle based at least in part on second, subsequent data from one or more of the sensors indicating a second, subsequent position associated with	select a cluster of the LEDs having light associated therewith that is directed at the target, determined based on the first target location;	

	driver of the other vehicle.				second cluster of the LEDs, by control of emission from the first cluster.	the other vehicle; and		
			diminish glaring illumination of the second other vehicle by a second change to one or more characteristics of second light of at least the second, different cluster,			control a second, subsequent change, to one or more characteristics of the light that is subsequently directed towards the other vehicle, that diminishes glare to the driver of the other vehicle when the other vehicle is at the	vary illumination provided to the target by the selected cluster, relative to illumination provided to areas laterally adjacent to the target and provided by at least one LED different from LEDs in the selected cluster; and	

						second position .		
			wherein the first and second changes decrease intensity of first emission from the first cluster and second emission from the second cluster relative to a third emission, from the at least one headlamp, illuminating an area between the first and second portion.				maintain a variance of illumination provided to the target relative to the laterally adjacent areas, when subsequent data from one or more of the cameras indicates a change in position of the target relative to the motor vehicle, by repeating the determination of target location . selectio	

							n of the cluster and variance to illumination provided to the target, relative to the laterally adjacent areas, based on the subsequent data.	

Exhibit OTH-G

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(54) Scheinwerfer für Fahrzeuge

Headlamp for vehicle

Projecteur pour véhicule

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Beschreibung

[0001] Die Erfindung betrifft einen Scheinwerfer für Fahrzeuge mit einem Gehäuse, mit einem im Inneren des Gehäuses angeordneten Abblendlicht- und einem Fernlichtmodul, mit Einstellvorrichtungen für das Abblendlichtmodul und das Fernlichtmodul, durch welche das Abblendlichtmodul zur Grundeinstellung um eine horizontale und vertikale Achse schwenkbar und das Fernlichtmodul zur Justierung um eine horizontale Achse schwenkbar ist, und mit einem zwischen Abblendlicht- und Fernlichtmodul verlaufenden Koppelelement, zwischen dem und dem Abblendlicht- und Fernlichtmodul jeweils eine gelenkartige Verbindung besteht, durch welches das Fernlichtmodul bei einem Schwenken des Abblendlichtmoduls um seine horizontale Achse um eine horizontale Achse mitschwenkt.

[0002] Ein solcher Scheinwerfer für Fahrzeuge ist aus der DE - U- 20202442 bekannt. Der Scheinwerfer weist ein aus Kunststoff bestehendes Gehäuse auf, dessen Vorderseite durch eine lichtdurchlässige Abschlussscheibe abgeschlossen ist. Im Inneren des Gehäuses ist ein Abblendlicht- und ein Fernlichtmodul angeordnet. Als Abblendlichtmodul dient ein Projektionsmodul und als Fernlichtmodul ein schalenförmiger Reflektor für Fernlicht. Die Vorderseiten des Abblendlicht- und Fernlichtmoduls sind in Lichtaustrittsrichtung zueinander versetzt angeordnet. Der Tragrahmen des Abblendlichtmoduls und des schalenförmigen Reflektors sind durch ein Koppelelement verbunden. Als Koppelelement dient ein Führungsstück, das mit Führungsflächen des Gehäuses zusammenwirkt und von den Führungsflächen vertikal gehaltert ist. Das Führungsstück haltert wiederum eine von einem Leuchtweiteregler gebildete Ei n-stellvorrichtung, die mit dem unteren Bereich des Tragrahmens des Abblendlichtmoduls gelenkig verbunden ist. Das Führungsstück haltert wiederum über den Leuchtweiteregler das Abblendlichtmodul. Durch den Leuchtweiteregler ist das Abblendlichtmodul um ein horizontale Achse schwenkbar. Die horizontale Achse ist definiert durch zwei zwischen dem oberen Bereich des Tragrahmens und dem Gehäuse bestehenden Schwenklager. Ein Schwenklager ist ortsfest ausgeführt, während das andere Schwenklager zu einer manuellen Einstellvorrichtung gehört. Durch diese Einstellvorrichtung ist das Abblendlichtmodul um eine vertikale Achse schwenkbar, die von der gelenkigen Verbindung zwischen dem Leuchtweiteregler und dem ortsfesten Schwenklager gebildet ist und die benachbart zu dem schalenförmigen Reflektor verläuft. Der schalenförmige Reflektor ist an seinem oberen Bereich über zwei Schwenklager mit dem Gehäuse verbunden. Die beiden Schwenklager sind jeweils mit einer manuellen Einstellvorrichtung gekoppelt und definieren eine horizontale Achse. Im unteren Bereich des schalenförmigen Reflektors ist das Führungsstück gelenkig mit dem Reflektor verbunden. Das Führungsstück ist zusammen mit dem Leuchtweiteregier durch eine manuelle Einstellvorrichtung, die eine mit dem Gehäuse verbundene Einstellschraube aufweist, in bzw. entgegen der Lichtaustrittsrichtung des Scheinwerfers verschiebbar. Dadurch ist das Abblendlichtmodul gemeinsam mit dem Fernlichtmodul um jeweils eine horizontale Achse manuell schwenkbar. Die beiden manuellen Einstellvorrichtungen des Fernlichtmoduls dienen zur Justierung des Fernlichtmoduls gegenüber dem Abblendlichtmodul. Das Führungsstück, welches das Fernlichtmodul mit dem Abblendlichtmodul koppelt, muss groß dimensioniert und in einer Führung des Gehäuses verschiebbar und gehaltert sein, da es die von dem Leuchtweiteregler gebildete Einstellvorrichtung und das Abblendlichtmodul trägt. Weiterhin kann wegen der großen Ausdehnung des Führungsstücks sich verziehen und ist dann nur noch schwergängig in der Führung des Gehäuses verschiebbar.

[0003] Aus der EP -A- 1 120 310 ist ein Scheinwerfer für Fahrzeuge bekanntgeworden, bei dem im Inneren des Scheinwerfers ein Abblendlichtmodul angeordnet ist, das durch eine von einem Leuchtweiteregler gebildete Einstellvorrichtung um ein horizontale Achse schwenkbar ist. Seitlich neben dem Abblendlichtmodul ist im Gehäuse eine Abstandsmesseinheit angeordnet. Die Abstandsmesseinheit ist an dem Gehäuse um zwei Schwenklager um eine horizontale Achse schwenkbar. Das Abblendlichtmodul und die Abstandsmesseinheit sind durch ein Koppelelement miteinander verbunden. Als Koppelelement dient ein Gelenkelement, das gelenkig mit dem Abblendlichtmodul und der Abstandsmesseinheit verbunden ist. Dadurch ist der Abblendlichtmodul und die Abstandsmesseinheit gemeinsam um jeweils eine horizontale Achse durch den Leuchtweiteregler schwenkbar. Das Gelenkelement besteht aus einem Gewindebolzen, der in eine an der Abstandsmesseinheit gelagerten Mutter eingreift und mit einem Kugelkopf gelenkig an dem Abblendlichtmodul gelagert ist. Dadurch ist die Abstandsmesseinheit gegenüber dem Abblendlicht justierbar. Nachteilig hierbei ist, dass die Justiervorrichtung aus vielen Einzelteilen besteht und nur durch umständlich durch eine durch einen Deckel verschließbare Gehäuseöffnung hindurch zugänglich ist. Ferner kann sich beim gemeinsamen Verstellen von Abblendlichtmodul und Abstandsmesseinheit die Justiervorrichtung mit bewegen und sich somit selbsttätig verstellen.

[0004] Aufgabe der Erfindung ist es, den im Oberbegriff des Anspruch 1 beschriebenen Scheinwerfer für Fahrzeuge derart zu verbessern, dass alle Einstellungen von dem Abblendlicht- und Fernlichtmodul des Koppelelements funktionssicher durchführbar sind. Diese Aufgabe wird nach der Erfindung dadurch gelöst, dass alle Einstellvorrichtungen für das Abblendlicht- und das Fernlichtmodul zwischen denselben und dem Gehäuse des Scheinwerfers bestehen und das Koppelelement ein Gelenkelement einer Gelenkvorrichtung ist und ausschließlich an gelenkartigen Verbindungen des Abblendlicht- und Fernlichtmoduls gehalten ist. Dadurch ist

ein einfacher Aufbau des Koppelelements möglich und die zur Justierung des Fernlichtmoduls dienende Einstellvorrichtung, durch die das Fernlichtmodul um eine horizontale Achse schwenkbar ist, kann so ausgeführt sein, dass sie von der Außenseite des Gehäuse her einfach und leicht zugänglich ist. Weiterhin können der Leuchtweiteregler und die zur Justierung des Fernlichtmoduls dienende Einstellvorrichtung ohne Rücksicht auf das Koppelelement und das Koppelelement ohne Rücksicht auf den Leuchtweiteregler und die zur Justierung des Fernlichtmoduls dienende Einstellvorrichtung dimensioniert und gestaltet sein.

[0005] Das Koppelelement ist kostengünstig herstellbar, wenn es stangenförmig ausgeführt und ein einstükkiges Bauteil ist.

[0006] Weiterhin ist es vorteilhaft, wenn das Koppelelement, bei in Lichtaustrittsrichtung versetzt zueinander angeordneten Vorderseiten des Abblendlicht- und Fernlichtmoduls, mindestens in einem Abschnitt zwischen den Vorderseiten verläuft, und die gelenkartigen Verbindungen der Gelenkvorrichtung an den sich benachbarten Randbereichen des Abblendlicht- und Fernlichtmoduls angeordnet sind. Dadurch baut das Koppelelement möglichst kurz und eine Dejustierung des Fernlichtmoduls durch eine Ausdehnung des Koppelelements infolge einer großen Temperaturerhöhung im Scheinwerferinneren ist sehr klein und somit nicht mehr störend. In diesem Zusammenhang ist es weiterhin vorteilhaft, wenn es entlang einer in Lichtaustrittsrichtung verlaufenden Vertikalebene verläuft und die gelenkartigen Verbindungen am vorderen und hinteren Endabschnitt des Koppelelements angeordnet sind. Dadurch ist an den gelenkartigen Verbindungen des Koppelelements beim gemeinsamen Verstellen von Abblendlichtmodul und Fernlichtmodul kein Verklemmen und Verkanten des Koppelelements möglich.

[0007] Ein weiterer Vorteil besteht, wenn eine gelenkartige Verbindung benachbart zu einem Gelenkpunkt der Einstellvorrichtung, durch die das Abblendlichtmodul um die horizontale Achse schwenkbar ist, an dem Abblendlichtmodul angeordnet ist. Durch diese Mittel ist auch bei einem leicht bauenden Abblendlichtmodul eine stabile Verbindung zwischen dem Abblendlichtmodul und dem Koppelelement gegeben. Je näher die gelenkartige Verbindung zu dem Gelenkpunkt angeordnet ist, um so leichtgängiger ist das Abblendlichtmodul um die durch den Gelenkpunkt hindurchgehende Achse schwenkbar. Besonders vorteilhaft ist es, wenn der die gelenkartige Verbindung von dem letzteren Gelenkpunkt gebildet ist.

[0008] Die Gelenkvorrichtung ist kostengünstig herstellbar und das Koppelelement ist einfach und schnell montierbar, wenn die gelenkartigen Verbindungen von einem Lagerzapfen und einer Lageröffnung gebildet sind, deren Schwenkachse quer zur Lichtaustrittrichtung des Scheinwerfers verläuft, und die Lagerzapfen und Lageröffnungen von einstückig mit Bauteilen des Abblendlichtmoduls bzw. Fernlichtmoduls ausgeführten Gelenkteilen gebildet sind.

[0009] Weiterhin ist es zweckmäßig, wenn die vertikale Achse für das Abblendlichtmodul durch Gelenkpunkte definiert ist, die am Abblendlichtmodul benachbart zum Fernlichtmodul angeordnet sind und zwischen dem Abblendlichtmodul und dem Gehäuse bestehen. Dadurch ist die Seite des Abblendlichtmoduls, die über das Koppelelement das Fernlichtmodul haltert, sicher gegen die im Fahrbetrieb auftretenden Vibrationen gehalten.

[0010] Bei einer besonders vorteilhaften Weiterbildung der Erfindung weist die dem Abblendlichtmodul zugeordnete Einstellvorrichtung, durch die das Abblendlichtmodul und das Fernlichtmodul gemeinsam um horizontale Achsen schwenkbar sind, eine Verstelleinrichtung zur Grundeinstellung des Abblendlicht- und Fernlichtmoduls und einen automatischen Leuchtweiteregler auf. Dadurch ist die Leuchtweite des Abblendlichtmoduls und des Fernlichtmoduls gemeinsam sowohl zur Grundeinstellung als auch durch den automatischen Leuchtweiteregler verstellbar. Die Verstelleinrichtung zur Grundeinstellung kann manuell oder automatisch durch den Leuchtweiteregler erfolgen.

[0011] Weiterhin ist es vorteilhaft, wenn das Fernlichtmodul ein schalenförmiger Reflektor und das Abblendlichtmodul ein Schwenkmodul für Kurvenlicht ist, wobei eine gelenkartige Verbindung des Koppelelements von einem das Kurvenlichtmodul umgebenden Rahmen gebildet ist. Da wegen der großen Masse eines Kurvenlichtmoduls sein zur Halterung dienender Rahmen stabil ausgeführt ist, ist auch das vergleichsweise leichte Fernlichtmodul über das Koppelelement sicher gegen Vibrationen gehalten.

[0012] Zwei Ausführungsbeispiele nach der Erfindung sind in der Zeichnung dargestellt und zwar zeigen

[0013] Figur 1 in einer perspektivischen Ansicht einen ersten Scheinwerfer für Fahrzeuge, bei dem ein Abblendlicht- und ein Fernlichtmodul gemeinsam durch Einstellvorrichtungen sowohl manuell als auch automatisch um horizontale Achsen schwenkbar sind, und

[0014] Figur 2 in einer perspektivischen Ansicht einen zweiten Scheinwerfer für Fahrzeuge, bei dem ein Abblendlicht- und ein Fernlichtmodul gemeinsam durch eine Einstellvorrichtung manuell um horizontale Achsen schwenkbar sind und ausschließlich das Abblendlichtmodul durch einen Leuchtweiteregler automatisch um eine horizontale Achse schwenkbar ist.

[0015] Der erste Scheinwerfer (Figur 1) für Fahrzeuge weist ein Abblendlichtmodul 1 und ein Fernlichtmodul 2 auf, welche in einem nicht dargestellten Gehäuse angeordnet sind. Die Vorderseiten 18 und 19 des Abblendlicht- und Fernlichtmoduls 1 und 2 sind in Lichtaustrittsrichtung versetzt zueinander angeordnet. Von dem Abblendlichtmodul 1 ist nur ein äußerer Rahmen 16 dargestellt. In den Rahmen 16 des Abblendlichtmoduls 1 ist ein nicht dargestelltes Schwenkmodul eingesetzt, welches für Kurvenlicht um eine vertikale Achse schwenkbar ist. Der Rahmen 16 ist über drei Gelenkpunkte 17, 20 und 21 mit dem Gehäuse verbunden. Die beiden Gelenkpunkte 17 und 21 sind in den Eckbereichen des dem

Fernlichtmodul 2 nahen Randbereich des Rahmens 16 angeordnet und definieren eine vertikale Achse 8. Um die vertikale Achse 8 ist das Abblendlichtmodul 1 bzw. der Rahmen 16 durch eine dem Gelenkpunkt 20 zugeordnete manuelle Einstellvorrichtung 3 zur Grundeinstellung schwenkbar. Die Einstellvorrichtung 3 ist an dem Gehäuse gehaltert und weist eine Getriebeanordnung 22 auf, durch die eine Verstellung des Abblendlichtmoduls 1 von der oberen Seite des Gehäuses her möglich ist. Der Gelenkpunkt 20 ist an einem äußeren unteren Eckbereich des Rahmens 16 und der Gelenkpunkt 21 am inneren unteren Eckbereich des Rahmens 16 angeordnet. Die beiden Gelenkpunkte 20 und 21 definieren eine horizontale Achse 7 um die das Abblendlichtmodul 1 durch eine dem oberen Gelenkpunkt 17 zugeordnete Einstellvorrichtung 4/5 schwenkbar ist. Die Einstellvorrichtung 4/5 setzt sich zusammen aus einer von einer manuellen Verstellvorrichtung gebildeten Einstellvorrichtung 4 und einer von einem automatischen Leuchtweiteregler gebildeten Einstellvorrichtung 5. Die Einstellvorrichtung 5 ist am Gehäuse gehaltert, während die Einstellvorrichtung 4 zwischen der Einstellvorrichtung 5 und dem Gelenkpunkt 17 angeordnet ist. Das Fernlichtmodul 2 ist gegenüber dem Abblendlichtmodul 1 nach vorne hin versetzt angeordnet. Als Fernlichtmodul 2 dient ein aus Kunststoff bestehender schalenförmiger Reflektor. An den unteren Randbereich des Fernlichtmoduls 2 sind zwei Gelenkpunkte 23 angebracht, die eine horizontale Achse 13 definieren und denen eine Einstellvorrichtung 6 zugeordnet ist. Die Einstellvorrichtung 6 besteht aus zwei an dem Gehäuse gehalterten Einstellschrauben. Das Fernlichtmodul 2 ist mit dem Abblendlichtmodul 1 durch ein Koppelelement 10 verbunden. Das Koppelelement 10 ist einstückig aus Kunststoff herstellt und stangenförmig ausgeführt. Zwischen den freien Endabschnitten des Koppelelements 10 und dem Abblendlicht- und Fernlichtmodul 1 und 2 besteht jeweils eine gelenkartig Verbindung 11 bzw. 12. Die gelenkartige Verbindung 11 ist nahe dem Gelenkpunkt 17 und die gelenkartig Verbindung 12 in dem dem Rahmen 16 benachbarten oberen Randbereich des Fernlichtlichtmoduls 2 angeordnet. Die gelenkartigen Verbindung 11 und 12 bestehen aus einem Lagerzapfen und einer Lageröffnung (nicht dargestellt). Der Lagerzapfen weist eine ballige Mantelfläche auf, ist in seiner Längsausdehnung geschlitzt und weist an seine beiden freien Endabschnitten jeweils eine Rastnase auf, die die Lageröffnung selbsttätig hintergreift. Die Lageröffnungen sind in eine äußere Wand des Rahmens 16 eingebracht. Bei einem manuellen oder automatischen Schenken des Abblendlichtmoduls 1 durch die Einstellvorrichtung 4/5 um die horizontale Achse 7 schwenkt das Fernlichtmodul 2 wegen dem Koppelelement 10 um die horizontale Achse 13. Die beiden an dem Gehäuse gehalterten Einstellschrauben der Einstellvorrichtung 6 sind von der Außenseite des Gehäuses her einfach und leicht zugänglich und schwenken das Fernlichtmodul bei gleichzeitiger Betätigung um die horizontale Achse 9, die durch die gelenkartige Verbindung 12 definiert ist. Dadurch ist das Fernlichtmodul 2 gegenüber dem Abblendlichtmodul 1 justierbar. Beim Verstellen der äußeren Einstellschraube der Einstellvorrichtung 6 ist schwenkt das Fernlichtmodul 2 um eine vertikale Achse 24, die durch den inneren Gelenkpunkt 23 und die gelenkartige Verbindung 12 hindurchgeht. Die äußere Einstellschraube der Einstellvorrichtung 6 dient somit der Grundeinstellung des Fernlichtmoduls 2. Der Abstand der gelenkartigen Verbindung 11 zur horizontalen Achse 7 des Abblendlichtmoduls 1 und der Abstand der gelenkartige Verbindung 12 zur horizontalen Achse des 13 des Fernlichtmoduls 2 sind gleich groß.

[0016] Der zweite Scheinwerfer (Figur 2) unterscheidet sich gegenüber dem ersten Scheinwerfer (Figur 1) durch nachstehend beschriebene Merkmale. Der automatische Leuchtweiteregler der Einstellvorrichtung 5 ist dem unteren Gelenkpunkt 21 zugeordnet und der Gelenkpunkt 20 ist in dem äußeren oberen Eckbereich des Rahmens 16 angeordnet. Dadurch schwenkt der Leuchtweiteregler der Einstellvorrichtung 5 ausschließlich das Abblendlichtmodul 1 um eine horizontale Achse 25, die durch die oberen Gelenkpunkte 17 und 20 hindurchgeht. Beim manuellen Einstellen des Abblendlichtmoduls 1 durch die Einstellvorrichtung 4 schenkt dieser um die horizontale Achse 7, die nur durch den unteren Gelenkpunkt 21 hindurchgeht. Die Einstellvorrichtung 4 ist mit jeweils einer Einstellschraube den Gelenkpunkten 17 und 20 zugeordnet.

Bezugszeichenliste:

[0017]

1. Abblendlichtmodul
2. Fernlichtmodul
3. Einstellvorrichtung
4. Einstellvorrichtung
5. Einstellvorrichtung
6. Einstellvorrichtung
7. horizontale Achse
8. vertikale Achse
9. horizontale Achse
10. Koppelelement
11. gelenkartige Verbindung
12. gelenkartige Verbindung
13. horizontale Achse
14. Gelenkvorrichtung
15. Bauteil
16. Rahmen
17. Gelenkpunkt
18. Vorderseite
19. Vorderseite
20. Gelenkpunkt
21. Gelenkpunkt
22. Getriebeanordnung
23. Gelenkpunkt
24. vertikale Achse
25. horizontale Achse

Patentansprüche

1. Scheinwerfer für Fahrzeuge mit einem Gehäuse, mit einem im Inneren des Gehäuses angeordneten Abblendlicht- und einem Fernlichtmodul (1 und 2), mit Einstellvorrichtungen (3, 4 und 5) für das Abblendlicht- und Fernlichtmodul (1 und 2), durch welche das Abblendlichtmodul (1) zur Grundeinstellung um eine horizontale und vertikale Achse (7 und 8) schwenkbar ist, und mit einer Einstellvorrichtung (6), durch welche das Fernlichtmodul (2) zur Justierung um eine horizontale Achse (9) schwenkbar ist und welche zwischen dem Fernlichtmodul (2) und dem Gehäuse des Scheinwerfers besteht, und mit einem zwischen Abblendlicht- und Fernlichtmodul (1 und 2) verlaufenden Koppelelement (10), zwischen dem und dem Abblendlicht- und Femlichtmodul (1 und 2) jeweils eine gelenkartige Verbindung (11 und 12) besteht, durch welches das Fernlichtmodul (2) bei einem Schwenken des Abblendlichtmoduls um seine horizontale Achse (7) um eine horizontale Achse (13) mitschwenkt, **dadurch gekennzeichnet, dass** sowohl die Einstellvorrichtungen (3, 4 und 5) für das Abblendlichtmodul (1), durch welche das Abblendlichtmodul (1) zur Grundeinstellung um eine horizontale und vertikale Achse (7 und 8) schwenkbar ist, als auch die Einstellvorrichtung (6) für das Fernlichtmodul (2), durch welche das Fernlichtmodul (2) zur Justierung um eine horizontale Achse (9) schwenkbar ist, zwischen dem Abblendlicht- bzw. Fernlichtmodul (1 bzw. 2) und dem Gehäuse des Scheinwerfers bestehen und das Koppelelement (10) ein Gelenkelement einer Gelenkvorrichtung (14) ist und ausschließlich an den gelenkartigen Verbindungen (11 und 12) des Abblendlicht- und Fernlichtmoduls (1 und 2) gehalten ist.

2. Scheinwerfer nach Anspruch 1, **dadurch gekennzeichnet, dass** das Koppelelement der Gelenkvorrichtung (14) stangenförmig ausgeführt und ein einstückiges Bauteil ist.

3. Scheinwerfer nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Koppelelement (10), bei in Lichtaustrittsrichtung versetzt zueinander angeordneten Vorderseiten (18 und 19) des Abblendlicht- und Fernlichtmoduls (1 und 2), mindestens mit einem Abschnitt zwischen den Vorderseiten (18 und 19) verläuft.

4. Scheinwerfer nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** das stangenartige Koppelelement (10) entlang einer in Lichtaustrittsrichtung verlaufenden Vertikalebene verläuft und die gelenkartigen Verbindungen (11 und 12) am vorderen und hinteren Endabschnitt des Koppelelements (10) angeordnet sind.

5. Scheinwerfer nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** eine gelenkartige Verbindung (11) benachbart zu einem Gelenkpunkt (17) der Einstellvorrichtung (4), durch die das Abblendlichtmodul (1) um die horizontale Achse (7) schwenkbar ist, an dem Abblendlichtmodul (1) angeordnet ist.

6. Scheinwerfer nach Anspruch 5, **dadurch gekennzeichnet, dass** eine Schwenkachse der gelenkartigen Verbindung (11) durch den Gelenkpunkt (17) hindurchgeht.

7. Scheinwerfer nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** der die gelenkartige Verbindung (11) von dem Gelenkpunkt (17) gebildet ist.

8. Scheinwerfer nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die gelenkartigen Verbindungen (11 und 12) von einem Lagerzapfen und einer Lageröffnung gebildet sind, deren Schwenkachse quer zur Lichtaustrittrichtung des Scheinwerfers verläuft.

9. Scheinwerfer nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** die Lagerzapfen und Lageröffnungen von einstückig mit Bauteilen (15) des Abblendlichtmoduls (1) bzw. Fernlichtmoduls (2) ausgeführten Gelenkteilen gebildet sind.

10. Scheinwerfer nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** die vertikale Achse (8) für das Abblendlichtmodul (1) durch Gelenkpunkte (16) definiert ist, die am Abblendlichtmodul (1) benachbart zum Fernlichtmodul (2) angeordnet sind und zwischen dem Abblendlichtmodul (1) und dem Gehäuse bestehen.

11. Scheinwerfer nach einem der Ansprüche 1 bis 10, **dadurch gekenn-zeichnet, dass** die dem Abblendlichtmodul (1) zugeordnete Einstellvorrichtung (4/5), durch die das Abblendlichtmodul (1) und das Femlichtmodul (2) um horizontale Achsen (7 und 13) und gemeinsam schwenkbar sind, eine Verstelleinrichtung (4) zur Grundeinstellung des Abblendlicht- und Fernlichtmoduls (1 und 2) aufweist.

12. Scheinwerfer nach Anspruch 11, **dadurch gekennzeichnet, dass** die dem Abblendlichtmodul (1) zugeordnete Einstellvorrichtung (4/5), durch die das Abblendlicht- und Femlichtmodul (1 und 2) um horizontale Achsen (7 und 13) schwenkbar sind, einen automatischen Leuchtweiteregler (5) aufweist.

13. Scheinwerfer nach einem der Ansprüche 1 bis 12, **dadurch gekennzeichnet, dass** das Fernlichtmodul (2) ein schalenförmiger Reflektor und das Abblendlichtmodul (1) ein Schwenkmodul für Kurven-

licht ist, wobei eine gelenkartige Verbindung (11) des Koppelelements (10) an einem das Kurvenlichtmodul umgebenden Rahmen (16) angeordnet ist.

14. Scheinwerfer nach einem der Ansprüche 1 bis 13, **dadurch gekenn-zeichnet, dass** die Einstellvorrichtung (6) für das Fernlichtmodul (2) von der Außenseite des Gehäuses her zugänglich ist.

Claims

1. Headlamp for vehicles with a housing, a low beam module and a high beam module (1 and 2) located inside the housing, with adjustment devices (3, 4 and 5, 6) for adjusting the low beam module and the high beam module (1 and 2) such that the low beam module (1) is made to turn around a horizontal and a vertical axis (7 and 8) to attain its neutral position, and with an adjustment device (6) which makes the high beam module (2) turn around a horizontal axis (9) for adjustment which is between the high beam module (2) and the housing of the headlamp, and with a coupling element (10) between the low beam module and the high beam module (1 and 2) which is connected to both the low beam module and the high beam module (1 and 2) by an articulated link (11 and 12) which makes the high beam module (2) turn around a horizontal axis (13) when the low beam module turns around its horizontal axis (7), **characterized in that** both the adjustment devices (3, 4 and 5) for the low beam module (1) which allow the low beam module (1) to be turned around a horizontal and vertical axis (7 and 8) to attain its neutral position, and the adjustment device (6) for the high beam module (2) which allows the high beam module (2) to be turned around a horizontal axis (9) for adjustment connect the low beam module (1) on the one hand and the high beam module (2) on the other with the housing of the headlamp and that the coupling element (10) is an articulated link of a linkage mechanism (14) which is only held by the articulated links (11 and 12) of the low beam module (1) and the high beam module (2).

2. Headlamp of claim 1, **characterized in that** the coupling element of the linkage mechanism (14) is a single-part component made in the shape of a rod.

3. Headlamp of claim 1 or 2, **characterized in that** at least one section of the coupling element (10) is located between the front sides (18 and 19) of the low beam module (1) and the high beam module (2) when these front sides (18 and 19) are at an offset in the direction of light exit.

4. Headlamp as in one of claims 1 to 3, **characterized in that** the rod-like coupling element (10) cuts vertically across the axis of the direction of light exit and that the articulated links (11 and 12) are located at the front and rear terminal sections of the coupling element (10).

5. Headlamp of claims 1 to 4, **characterized in that** an articulated link (11) is attached to the low beam module (1) adjacent to a junction point (17) of the adjustment mechanism (4) which allows the low beam module (1) to be turned around the horizontal axis (7).

6. Headlamp of claim 5, **characterized in that** a rotation axis of the articulated link (11) cuts through the junction point (17).

7. Headlamp of claim 5 or claim 6, **characterized in that** the articulated link (11) is provided by the junction point (17).

8. Headlamp of claims 1 to 7, **characterized in that** the articulated joints (11 and 12) are made up of a journal and bearing cup each whose axis of rotation is diagonally across the direction of the headlamp light.

9. Headlamp of claims 1 to 8, **characterized in that** the journals and bearing cups are made up of link parts which are made up of single-part components (15) of the low beam module (1) or the high beam module (2).

10. Headlamp of claims 1 to 9, **characterized in that** the vertical axis (8) of the low beam module (1) is defined by junction points (16) attached to the low beam module (1) adjacent to the high beam module (2) and located between the low beam module (1) and the housing.

11. Headlamp of claims 1 to 10, **characterized in that** the adjustment mechanism (4/5) allocated to the low beam module (1) which allows the low beam module (1) and the high beam module (2) to be turned together around horizontal axes (7 and 13) features an adjustment mechanism (4) for resetting the low beam module (1) and the high beam module (2) to their normal positions.

12. Headlamp of claim 11, **characterized in that** the adjustment mechanisms (4/5) allocated to the low beam module (1) which allow the low beam module (1) and the high beam module (2) to be turned around horizontal axes (7 and 13) features an automatic headlamp leveling system (5).

13. Headlamp of claims 1 to 12, **characterized in that** the high beam module (2) is a dish-shaped reflector and the low beam module (1) is a projector gr for

bend lighting where an articulated link (11) of the coupling element (10) is connected to a frame (16) around the bend lighting module.

14. Headlamp of claims 1 to 13, **characterized in that** the adjustment mechanism (6) for the high beam module (2) can be accessed from the outside of the housing.

Revendications

1. Projecteur pour véhicules, comprenant un boîtier, avec un module de feu de croisement (1) et un module de feu de route (2) disposés à l'intérieur du boîtier, avec des dispositifs de réglage (3, 4 et 5) du module de feu de croisement (1) et du module de feu de route (2) qui permettent de faire pivoter le module de feu de croisement (1) autour d'un axe horizontal (7) et vertical (8) pour le réglage de base, et avec un dispositif de réglage (6) qui permet de faire pivoter le module de feu de route (2) autour d'un axe horizontal (9) pour l'alignement et qui est disposé entre le module de feu de route (2) et le boîtier du projecteur, et avec un élément d'accouplement (10), qui s'étend entre le module de feu de croisement (1) et le module de feu de route (2) et entre lequel et les modules de feu de croisement et de feu de route (1 et 2) se trouve respectivement une liaison articulée (11 et 12), qui entraîne le module de feu de route (2) en rotation autour d'un axe horizontal (13) lorsque le module de feu de croisement pivote autour de son axe horizontal (7), **caractérisé en ce que** les dispositifs de réglage (3, 4 et 5) du module de feu de croisement (1), qui permettent de faire pivoter le module de feu de croisement (1) autour d'un axe horizontal (7) et vertical (8) pour le réglage de base, de même que le dispositif de réglage (6) du module de feu de route (2), qui permet de faire pivoter le module de feu de route (2) autour d'un axe horizontal (9) pour l'alignement, se trouvent entre le module de feu de croisement (1) ou le module de feu de route (2) et le boîtier du projecteur et **en ce que** l'élément d'accouplement (10) est un élément d'articulation d'un système articulé (14) et est fixé exclusivement sur les liaisons articulées (11 et 12) du module de feu de croisement (1) et du module de feu de route (2).

2. Projecteur selon la revendication 1, **caractérisé en ce que** l'élément d'accouplement du système articulé (14) est réalisé en forme de tige et constitue un composant d'une seule pièce.

3. Projecteur selon la revendication 1 ou la revendication 2, **caractérisé en ce que**, lorsque les faces avant (18 et 19) du module de feu de croisement (1) et du module de feu de route (2) sont disposées de manière décalée l'une par rapport à l'autre dans le sens de sortie de la lumière, une section au moins de l'élément d'accouplement (10) s'étend entre les faces avant (18 et 19).

4. Projecteur selon l'une des revendications 1 à 3, **caractérisé en ce que** l'élément d'accouplement en forme de tige (10) s'étend dans un plan vertical qui s'étend dans le sens de sortie de la lumière et **en ce que** les liaisons articulées (11 et 12) sont disposées dans la partie d'extrémité avant et arrière de l'élément d'accouplement (10).

5. Projecteur selon l'une des revendications 1 à 4, **caractérisé en ce qu'**une liaison articulée (11) est disposée sur le module de feu de croisement (1) au voisinage d'un point d'articulation (17) du dispositif de réglage (4) qui permet de faire pivoter le module de feu de croisement (1) autour de l'axe horizontal (7).

6. Projecteur selon la revendication 5, **caractérisé en ce qu'**un axe de pivotement de la liaison articulée (11) passe par le point d'articulation (17).

7. Projecteur selon la revendication 5 ou la revendication 6, **caractérisé en ce que** la liaison articulée (11) est formée par le point d'articulation (17).

8. Projecteur selon l'une des revendications 1 à 7, **caractérisé en ce que** les liaisons articulées (11 et 12) sont formées par un tourillon et par une ouverture d'appui dont l'axe de pivotement est perpendiculaire au sens de sortie de la lumière du projecteur.

9. Projecteur selon l'une des revendications 1 à 8, **caractérisé en ce que** les tourillons et les ouvertures d'appui sont formées par des pièces d'articulation réalisées d'un seul tenant avec des composants (15) du module de feu de croisement (1) ou du module de feu de route (2).

10. Projecteur selon l'une des revendications 1 à 9, **caractérisé en ce que** l'axe vertical (8) du module de feu de croisement (1) est défini par des points d'articulation (16) qui sont disposés sur le module de feu de croisement (1) au voisinage du module de feu de route (2) et qui se trouvent entre le module de feu de croisement (1) et le boîtier.

11. Projecteur selon l'une des revendications 1 à 10, **caractérisé en ce que** le dispositif de réglage (4/5) associé au module de feu de croisement (1), permettant de faire pivoter le module de feu de croisement (1) et le module de feu de route (2) autour d'axes horizontaux (7 et 13) et ensemble, présente un système ajustable (4) pour le réglage de base du module de feu de croisement (1) et du module de

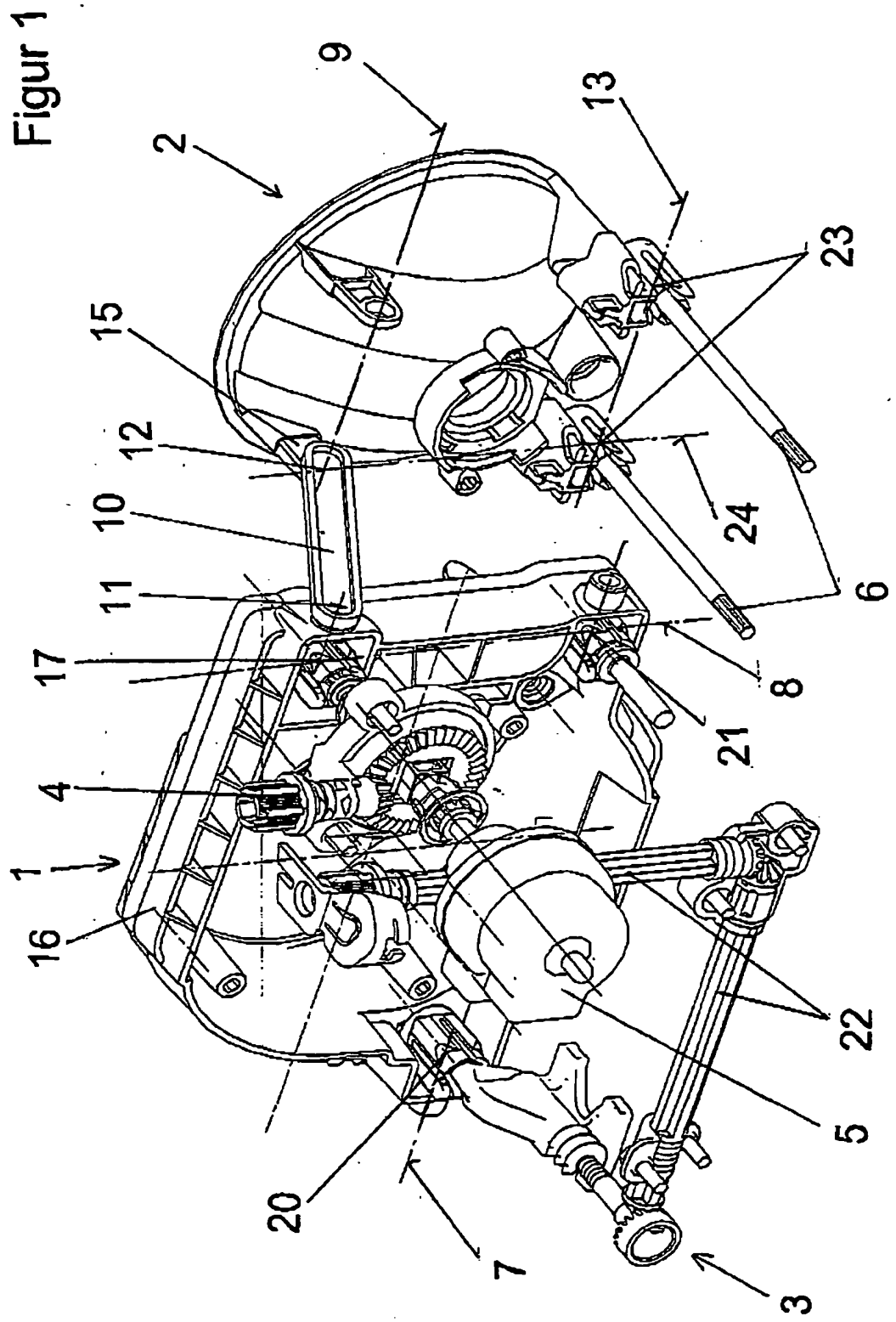
feu de route (2).

12. Projecteur selon la revendication 11, **caractérisé en ce que** le dispositif de réglage (4/5) associé au module de feu de croisement (1), permettant de faire pivoter le module de feu de croisement (1) et le module de feu de route (2) autour d'axes horizontaux (7 et 13), présente un régulateur automatique de la portée d'éclairage (5).

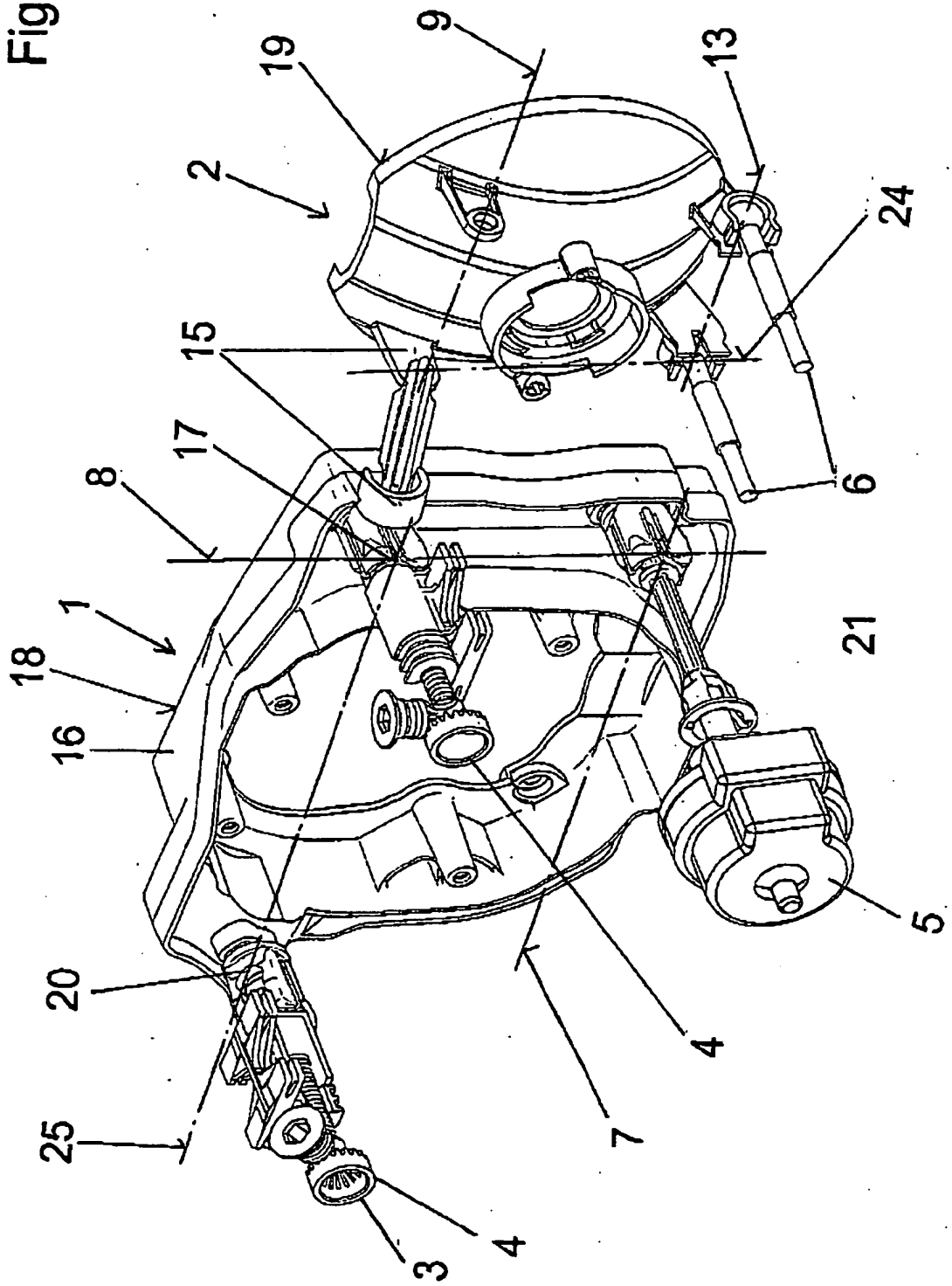
13. Projecteur selon l'une des revendications 1 à 12, **caractérisé en ce que** le module de feu de route (2) est un réflecteur en forme de bol et le module de feu de croisement (1) est un module pivotant pour l'éclairage dans les virages, une liaison articulée (11) de l'élément d'accouplement (10) étant disposée sur un cadre (16) entourant le module d'éclairage dans les virages.

14. Projecteur selon l'une des revendications 1 à 13, **caractérisé en ce que** le dispositif de réglage (6) du module de feu de route (2) est accessible de l'extérieur du boîtier.

Figur 1



Figur 2



IN DER BESCHREIBUNG AUFGEFÜHRTE DOKUMENTE

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In der Beschreibung aufgeführte Patentdokumente

- DE 20202442 U **[0002]**
- EP 1120310 A **[0003]**

Exhibit OTH-H

U.S. Patent No. 6,752,523 B2

Takahashi

US006752523B2

(12) **United States Patent**
Takahashi

(10) **Patent No.: US 6,752,523 B2**
(45) **Date of Patent: Jun. 22, 2004**

(54) **VEHICLE LAMP**

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(73) Assignee: **Koito Manufacturing Co., Ltd.**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 57 days.

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(22) Filed: **Oct. 22, 2002**

(65) **Prior Publication Data**

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**[7] **F21V 13/04**

(52) **U.S. Cl.** **362/545**; 362/522; 362/245; 362/800

(58) **Field of Search** 362/545, 522, 362/245, 328, 240, 800, 309, 308, 307, 300, 520, 544, 543, 236

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,862,330	A	8/1989	Machida et al.	362/522
5,678,335	A	10/1997	Gomi et al.	40/550
6,038,387	A	3/2000	Machida	703/2
6,578,989	B2 *	6/2003	Osumi et al.	362/298

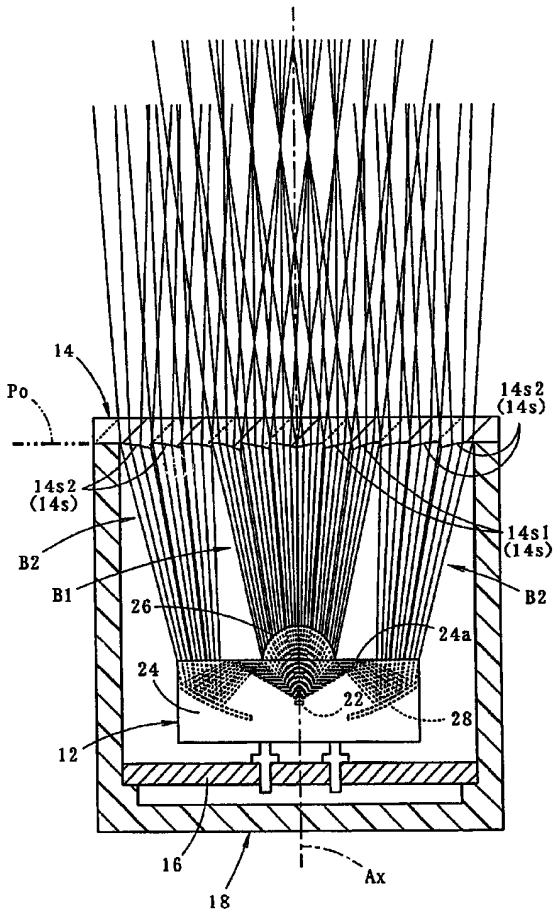
* cited by examiner

Primary Examiner—Sandra O'Shea
Assistant Examiner—B Q T
(74) *Attorney, Agent, or Firm*—Koda & Androlia

(57) **ABSTRACT**

A vehicle lamp that uses a special LED made of: translucent block body, an LED chip embedded in the translucent block body, a semi-spherical shape condenser lens provided on the front end surface of the translucent block body and positioned in front of the LED chip, and a reflector provided inside the translucent block body and forwardly reflects the light from the LED chip. The vehicle lamp includes a front lens disposed in front of the special LED so that the front lens is positioned where the direct light from the LED chip and the reflection light reflected by the reflector start to intersect with each other.

9 Claims, 8 Drawing Sheets



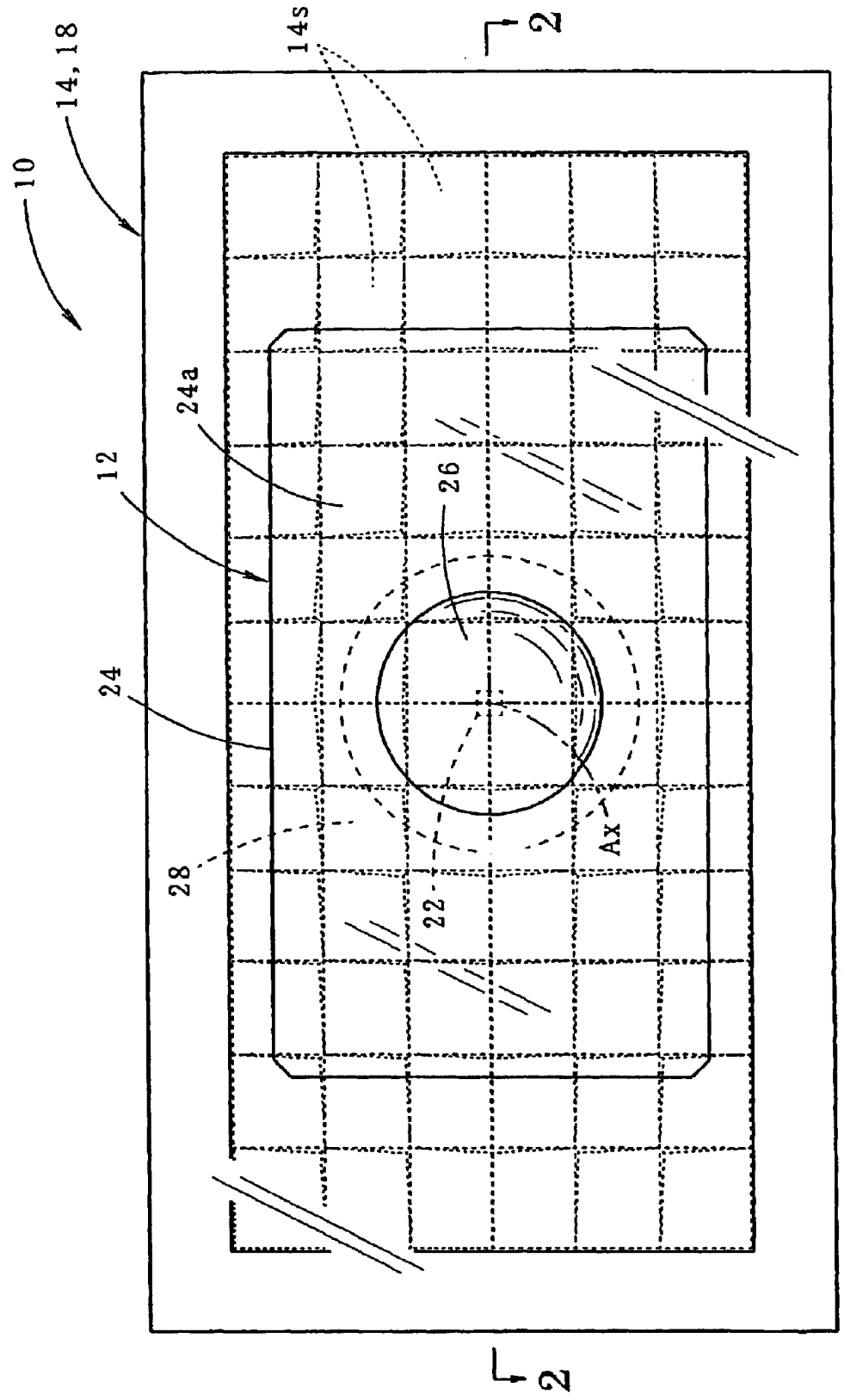


FIG. 1

FIG. 2

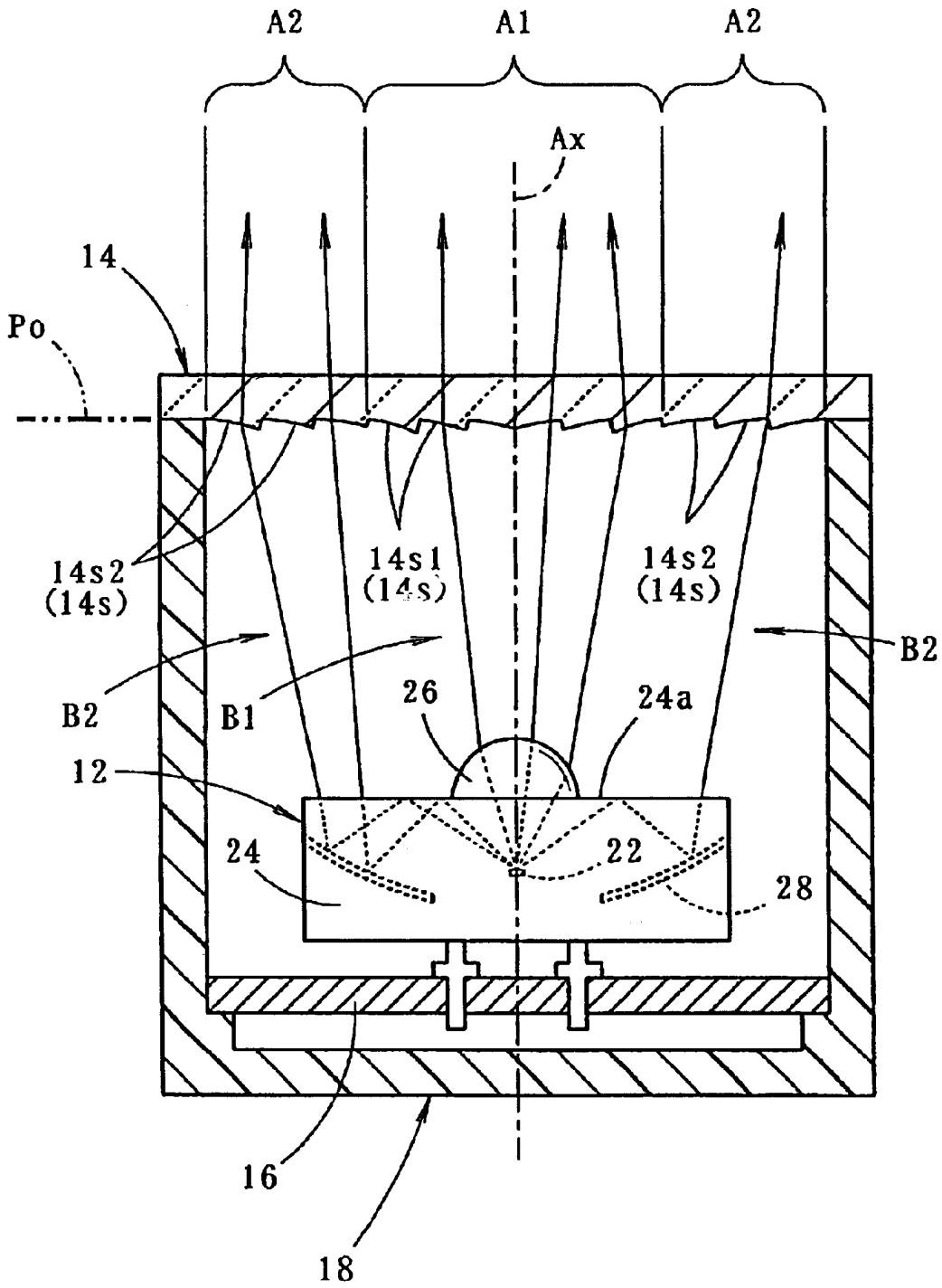
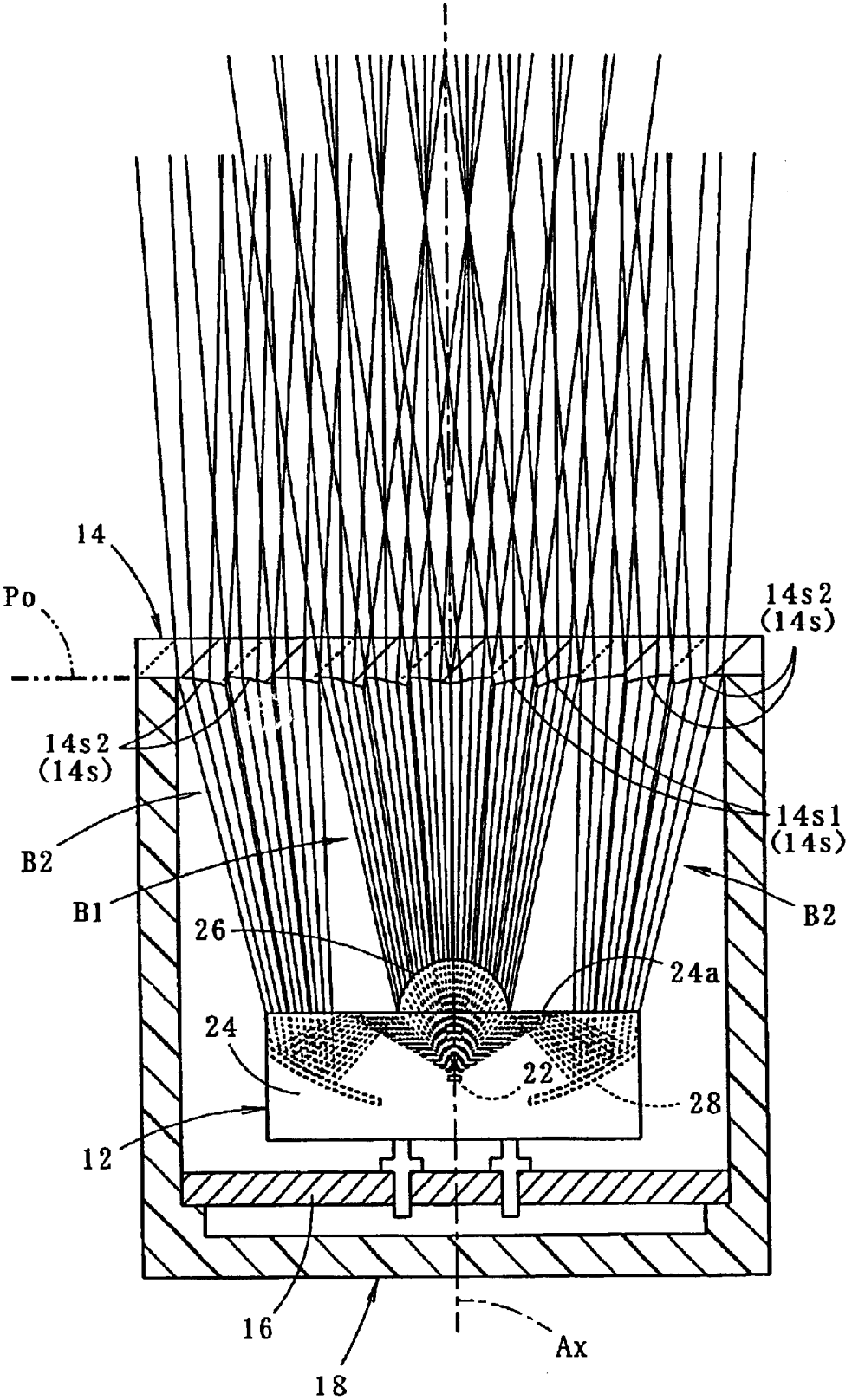

A2
A1
A2
Ax
14
Po
14s2
(14s)
14s1
(14s)
14s2
(14s)
B2
B1
B2
26
24a
12
24
22
28
16
18

FIG. 3


14
Po
14s2
(14s)
14s2
(14s)
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(14s)
B2
B1
B2
26
24a
24
22
28
12
16
18
Ax

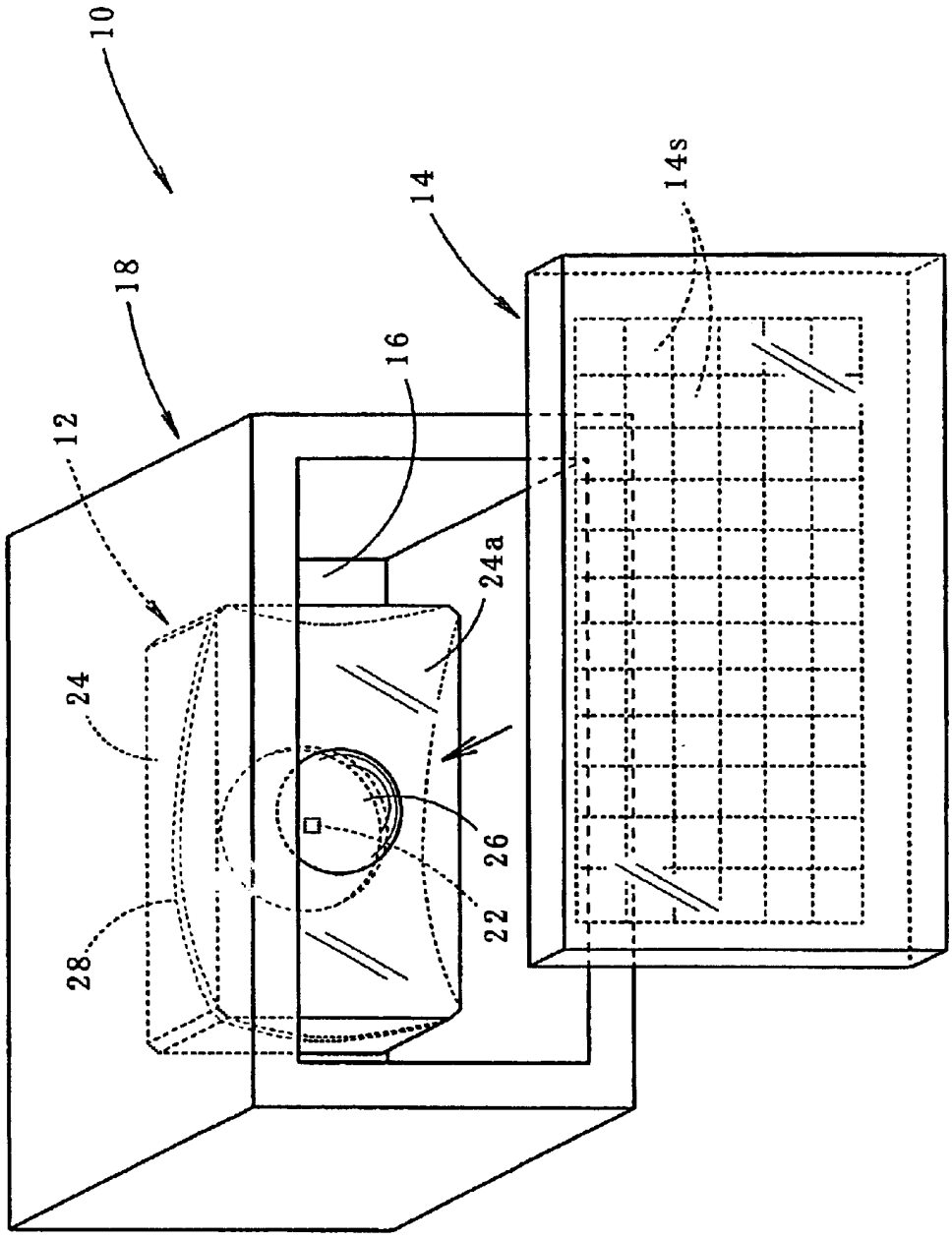


FIG. 4

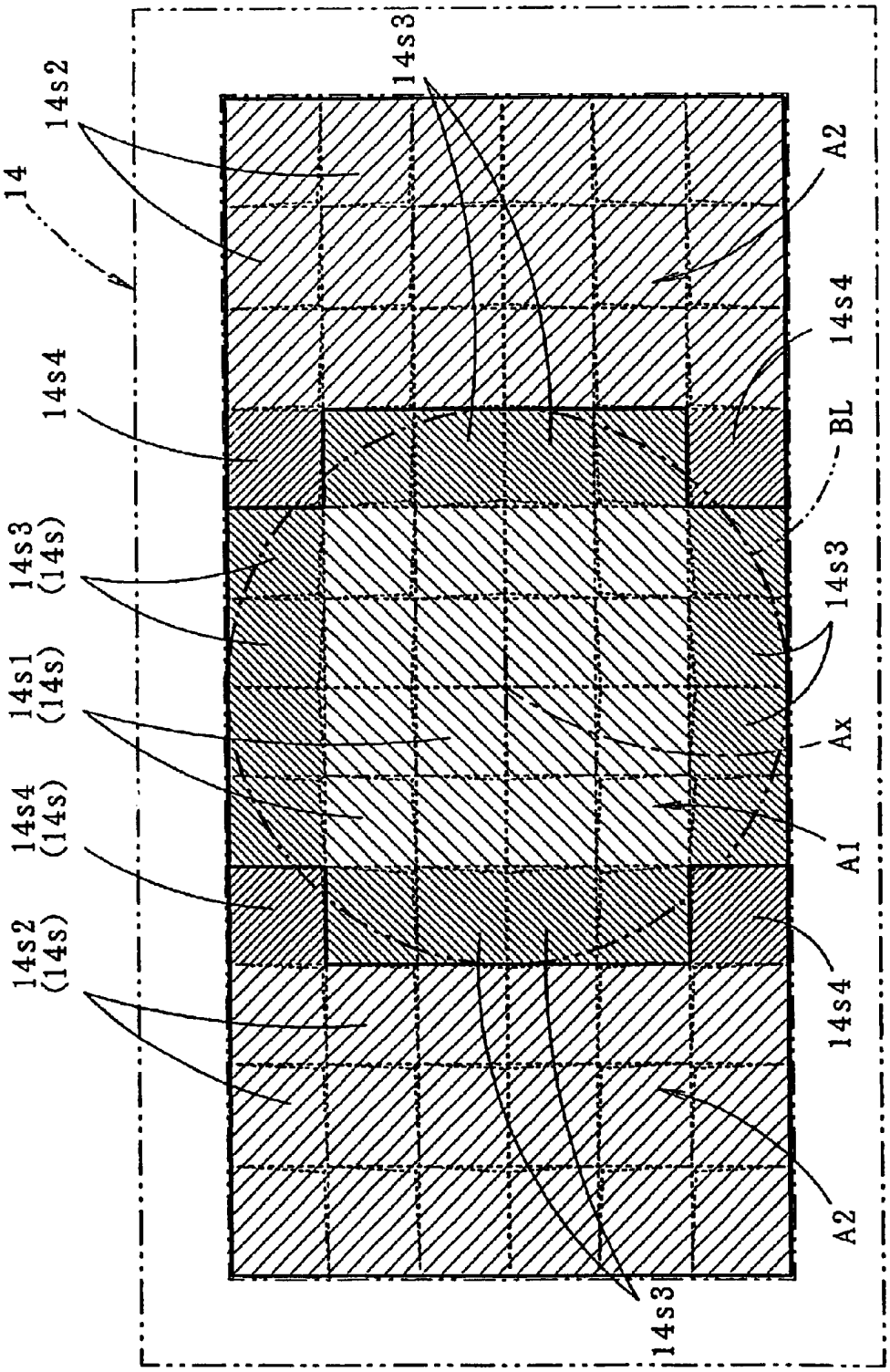

14s3
14s2
14
A2
14s4
14s4
BL
14s3
(14s)
14s3
14s1
(14s)
Ax
14s4
(14s)
A1
14s2
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14s4
A2
14s3

FIG. 5

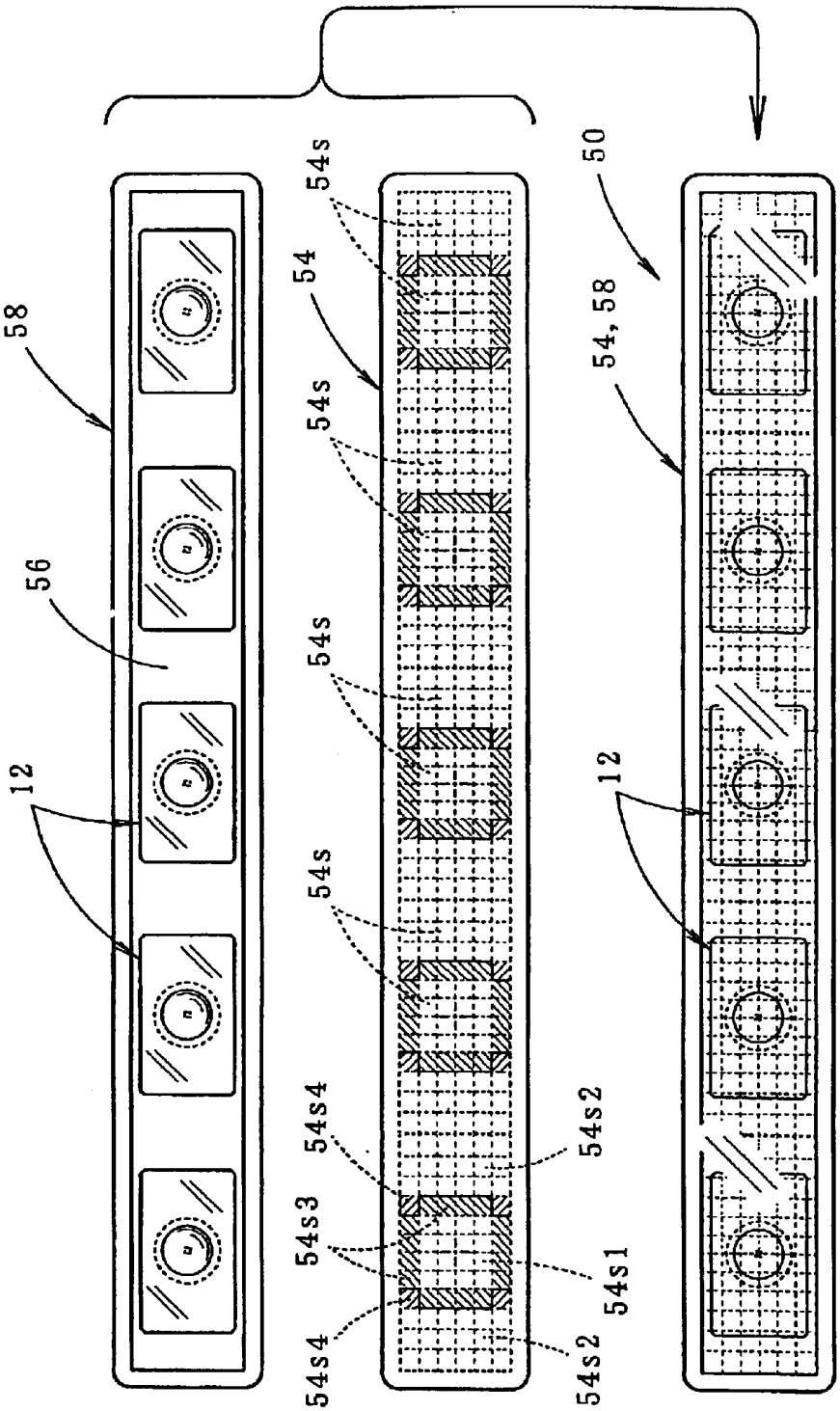


FIG. 6(a) FIG. 6(b) FIG. 6(c)

FIG. 7

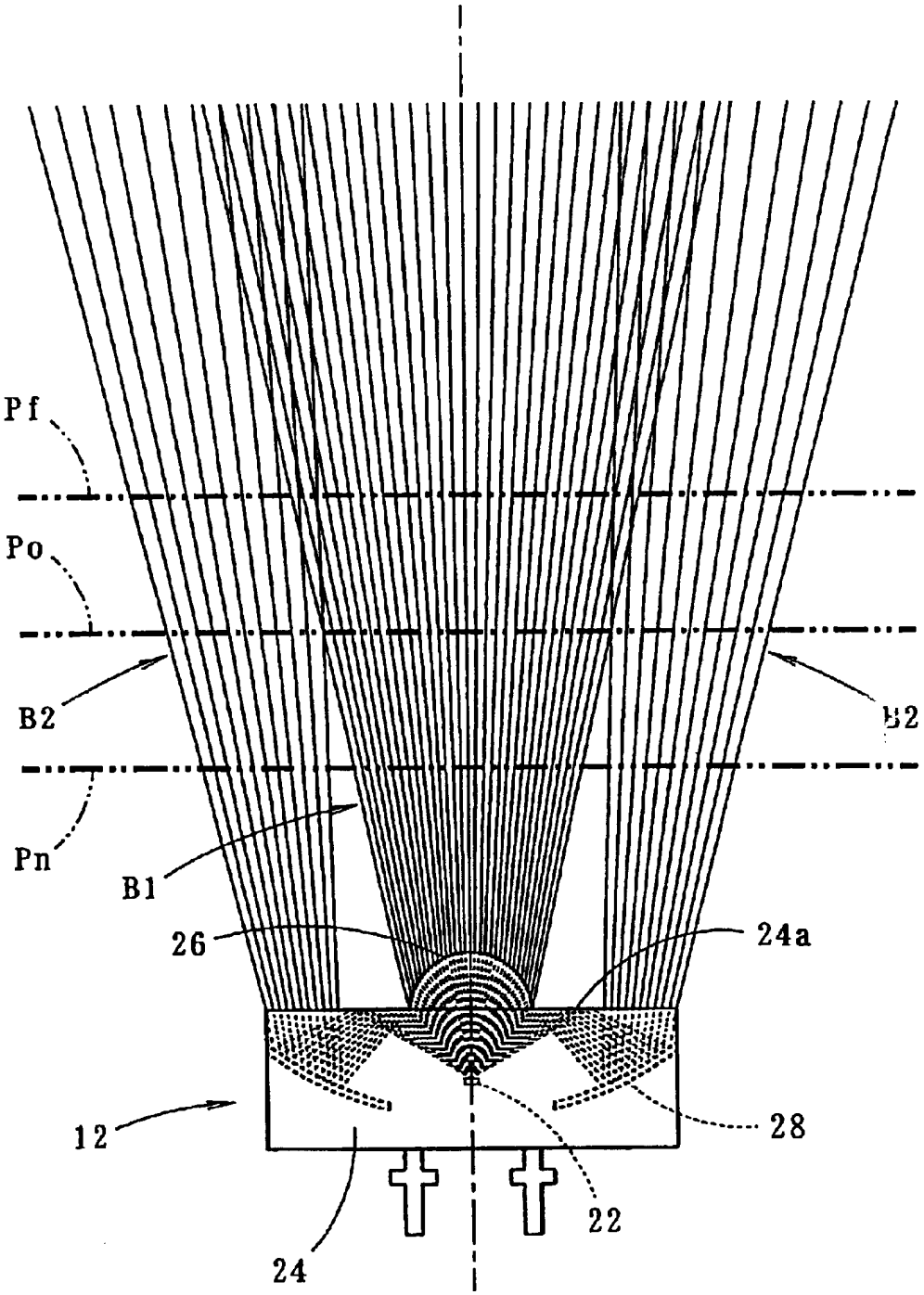
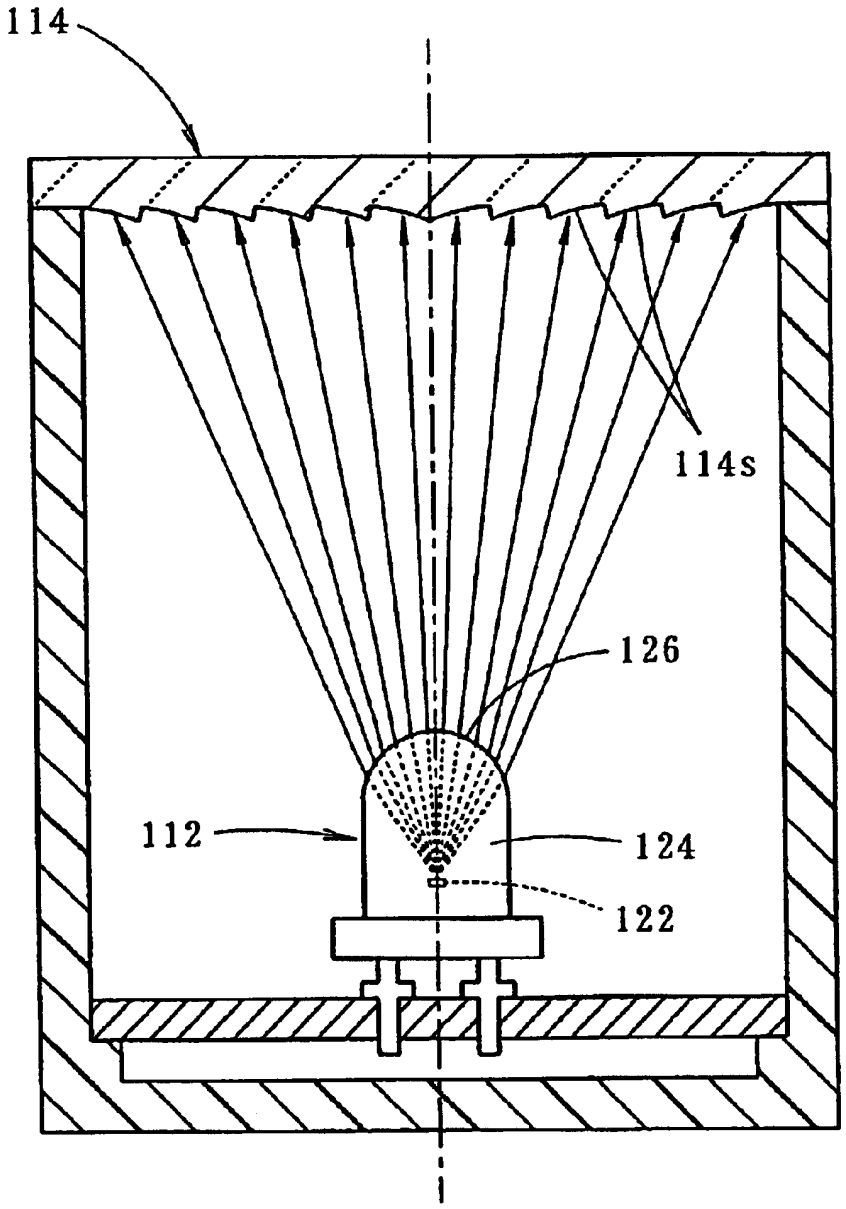


FIG. 8

PRIOR ART



VEHICLE LAMP

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a vehicle lamp that uses, as a light source thereof, a special LED or a custom LED which is different from an ordinary LED.

2. Prior Art

A lamp structure that employs LEDs (light emitting diodes) is often adopted for vehicle lamps such as high-mount stop lamps and the like.

In such a vehicle lamp that uses LEDs, as shown in FIG. **8**, the light from an LED **112** is subjected to a diffusion deflection control by a plurality of lens elements **114***s* formed on a front lens **114** provided in front of the LED **112**. However, since the LED **112** emits only a small amount of light, it is difficult to produce a sufficient amount of illumination light for a vehicle lamp.

More specifically, as seen from FIG. **8**, in an ordinary LED **112**, of the light radiated from an LED chip **122** that is embedded in a bullet-shaped translucent body **124**, the radiation light within a predetermined range of angle with respect to the forward direction of the lamp is used by way of rendering it to be refracted toward the front with the use of a substantially semi-spherical condenser lens **126** that forms the front end portion of the translucent body **124**. However, the light radiated at a great radiation angle with respect to the forward direction becomes stray light and therefore cannot be used for illumination. Accordingly, a vehicle lamp that incorporates the LED **112** as described above cannot easily provide a sufficient amount of illumination light

The alternative is a method in which, instead of an ordinary LED, a special LED **12** as shown in FIG. **7** is used as a light source of a vehicle lamp.

In this special LED **12**, of the light radiated from an LED chip **22** embedded in a translucent block body **24**, the radiation light within a predetermined range of angle with respect to the forward direction is used, as in an ordinary LED, by way of rendering it to be refracted toward the front with the use of a condenser lens **26** that is formed to protrude in a substantially semi-spherical shape from the front end surface **24***a* of the translucent block body **24**. As to the light radiated at a great radiation angle with respect to the forward direction, such is used also by reflecting the light by a portion of the front end surface **24***a* of the translucent block body **24** that is an area around the condenser lens **26** and then reflecting it by a reflector **28** provided inside the translucent block body **24**.

With the use of the special LED **12**, the utilization efficiency of the light radiating from the LED chip **22** increases, and as a result, the amount of light emitted increases also. It becomes thus possible to provide a sufficient illumination light intensity required for vehicle lamps.

However, a mere disposing of a front lens in front of the special LED **12** causes problems.

More specifically, in FIG. **7**, the direct light B**1** passing through the condenser lens **26** does not form a bundle of parallel rays, and it forms a bundle of diffused rays. Accordingly, the direct light B**1** starts to intersect with the reflection light B**2**, which is from the reflector **28**, at a position Po that is some distant in front of the special LED **12**.

As a result, when the front lens is disposed at a position Pf that is greatly apart from the special LED **12**, the front lens has an overlapped incidence area where the overlapped direct light B**1** and reflection light B**2** are incident. Therefore, in the overlapped incidence area, the direct light B**1** and the reflection light B**2** are inevitably subjected to the same diffusion deflection control. However, the direct light B**1** and the reflection light B**2** have different directions of incidence on the front lens, and the direct light B**1** has a greater luminous intensity than the reflection light B**2**. Thus, the problem is that a diffusion deflection control on light from the special LED **12** by means of the front lens cannot be done appropriately.

Conversely, if the front lens is disposed at a position Pn that is closer to the special LED **12**, the direct light B**1** and the reflection light B**2** impinge on the front lens without any intersection, so that the front lens has a no-light impinging area where no light from the special LED **12** is incident. The no-light impinging area appears as a ring-shaped dark area when the lamp is on. Thus, the problem is that the appearance of the lamp is degraded.

SUMMARY OF THE INVENTION

Accordingly, the present invention is to solve the problems described above.

It is an object of the present invention to provide a vehicle lamp that includes a special LED or a custom LED wherein the lamp is capable of appropriately performing diffusion deflection control on the light from the special LED by means of a front lens without degrading the appearance of the lamp.

The present invention achieves the object by contriving the layout of a front lens.

More specifically, the above object is accomplished by a unique structure of the present invention for a vehicle lamp that includes a special LED, which is a light source, and a front lens, which is provided in front of the special LED and performs a diffusion deflection control of light from the special LED by a plurality of lens elements formed on the front lens; and in the present invention,

the special LED is comprised of a translucent block body, an LED chip embedded in the translucent block body, a condenser lens protruded in a substantially semi-spherical shape on the front end surface of the translucent block body and positioned in front of the LED chip, and a reflector provided inside the translucent block body so as to forwardly reflect the light originated by the LED chip and reflected by a portion of the front end surface of the translucent block body that is a peripheral area of the condenser lens; and

the front lens is disposed near a position where the direct light from the LED chip and passing through the condenser lens and a reflection light reflected by the reflector start to intersect with each other.

The front lens can take any structure in terms of layout and shape of each lens element formed thereon as long as the front lens is designed so that the light from the special LED is subjected to a diffusion deflection control by the lens elements.

Each lens element can be a lens element that merely has a function of diffusing incident light or be a lens element that merely has a function of deflecting the incident light. Furthermore, it can be a lens element that has functions to diffuse and deflect the incident light.

In the vehicle lamp of the present invention, the special LED, which is the light source, is comprised of a translucent block body, an LED chip embedded in the translucent block

body, a condenser lens protruded in a substantially semi-spherical shape on the front end surface of the translucent block body and positioned in front of the LED chip, and a reflector provided inside the translucent block body so as to forwardly reflect the light originated by the LED chip and reflected by a portion of the front end surface of the translucent block body that is an area around the condenser lens. Accordingly, the light irradiated from the LED chip in directions within a predetermined range of angle with respect to the front of the LED chip is refracted toward the front by the condenser lens and can be used for illumination, and in addition the light radiating at great radiation angles with respect to the forward direction can be also used as reflection light from the reflector. Accordingly, the use efficiency of the radiation light from the LED chip is improved, and the amount of light emitted is increased. Consequently, the lamp sufficiently provides an amount of illumination light required for a vehicle.

In the vehicle lamp of the present invention, the light from the special LED is subjected to a diffusion deflection control by a plurality of lens elements of the front lens provided in front of the special LED. Since the front lens is disposed near the position where the direct light passing through the condenser lens and the reflection light from the reflector start to intersect with each other, the lamp has various advantages.

Though the direct light and the reflection light differ from each other in the direction of incidence and the intensity, since the front lens is disposed near the position at which the direct light and the reflection light start to intersect with each other, the formation of an overlapped incidence area in the front lens where the overlapped direct and reflection lights is incident is avoided. Thus, it is possible to appropriately perform the diffusion deflection control on the light from the special LED by means of the front lens.

Furthermore, since the front lens is disposed near the position where the direct light and the reflection light start to intersect with each other, the formation of a ring-shaped no-light impinging area in the front lens where no light from the special LED is incident is prevented. Thus, the front lens appears bright over the entire surface when the lamp is on, and appearance degradation of the lamp is prevented.

As seen from the above, according to the present invention, a vehicle lamp that includes a special LED appropriately performs a diffusion deflection control on the light that is from the special LED by means of the front lens without causing any degradation in the appearance of the lamp.

In the meantime, as described above, the direct light passing through the condenser lens has a higher light intensity than the reflection light from the reflector. Therefore, if, of the plurality of lens elements that form the front lens, a lens element positioned in a direct light impinging area where the direct light impinges has a diffusion angle that is set at a value which is greater than a diffusion angle of a lens element positioned in a reflection light impinging area where the reflection light impinges, then the entire front lens appears substantially uniformly bright when the lamp is on. The appearance of the lamp is thus enhanced.

Meanwhile, the borderline between the direct light impinging area and the reflection light impinging area appears in a substantially circular shape on the front lens. Accordingly, if a plurality of lens elements are disposed in a grid pattern, some of the lens elements are positioned on the borderline between the direct light impinging area and the reflection light impinging area. In such a structure, by way of setting the diffusion angle of each lens element positioned on the border line at a diffusion angle that is set for the lens element of the two areas that correspond to one of the direct light and the reflection light that impinges in a greater amount, it becomes possible to perform a sufficiently appropriate diffusion deflection control.

The vehicle lamp of the present invention uses either a single special LED or a plurality of special LEDs as a light source.

When a plurality of special LEDs are employed, they are disposed so as to have an aligned irradiation direction. In this structure that uses a plurality of special LEDs, the front lens includes a plurality of lens elements that perform, for each one of the special LEDs, the diffusion deflection control on the light from the special LEDs. Thus, the front lens appears bright for a broad luminescent area.

Furthermore, it can be designed so that a plurality of special LEDs are disposed in a row and each special LED has a substantially rectangular shape that is elongated in the direction of the row or linear arrangement of the LEDs. With this structure, a thin-type lamp structure suitable for a high-mount stop lamp or the like can easily be produced.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front view of a vehicle lamp according to one embodiment of the present invention;

FIG. **2** is a sectional view taken long the line **2**—**2** in FIG. **1**, illustrating the vehicle lamp;

FIG. **3** shows the detail of the light path in the structure of FIG. **2**;

FIG. **4** is an exploded perspective view of the vehicle lamp of the present invention;

FIG. **5** is a front view of a plurality of lens elements that make a front lens of the vehicle lamp of the present invention;

FIG. **6**(*a*) is a front view of a lamp body with five special LEDs mounted thereon, FIG. **6**(*b*) is a front view of a front lens therefor, and FIG. **6**(*c*) is a front view in which the lamp body and the front lens are assembled into a vehicle lamp;

FIG. **7** shows a single special LED used in the embodiment of the present invention; and

FIG. **8** shows in cross section a conventional vehicle lamp that uses an LED.

DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the vehicle lamp according to the present invention will be described below in detail with reference to the accompanying drawings.

As seen from FIGS. **1** through **4**, the vehicle lamp **10** in the shown embodiment is a small-size lamp unit. A plural number of vehicle lamps **10** can be arrange, for instance, side by side so that they make a marker lamp such as a tail lamp, a stop lamp, etc.

The vehicle lamp **10** includes a special LED **12** as a light source, a front lens **14** that is disposed in front of the special LED **12** and performs diffusion deflection control of the light from the special LED **12** by means of lens elements **14***s* formed thereon, a printed circuit board **16** supporting the special LED **12** thereon, and a lamp body **18** that contains the printed circuit board **16** and the special LED **12** and supports at a front end surface thereof the front lens **14**.

The special LED **12** is a custom LED assembly that is comprised of a translucent block body **24**, an LED chip **22**

embedded in the translucent block body **24**, a condenser lens **26** protruded in a substantially semi-spherical shape on the front end surface **24***a* of the translucent block body **24** so as to be located in front of the LED chip **22**, and a reflector **28** that reflects the light that is from the LED chip **22** and is, as best seen from FIG. **2**, reflected (internally reflected) from the portion of the front end surface **24***a* of the translucent block body **24** that is located around the condenser lens **26**.

The special LED **12** has a substantially rectangular shape that is elongated in a lateral (horizontal) direction in the front view of the lamp (see FIG. **1**) and is disposed so that the LED chip **22** is positioned on a lamp optical axis Ax that extends in a front-back direction (or in the direction of the depth) of the lamp (see FIG. **2**).

The light which is from the LED chip **22** and is incident upon the condenser lens **26** is refracted toward the lamp optical axis Ax. Accordingly, the direct light B**1** passing through the condenser lens **26** forms a bundle of diffuse rays expanding in a conical shape about the lamp optical axis Ax. On the other hand, the reflection light B**2** from the reflector **28** forms a ring-shaped bundle of diffuse rays expanding about a conical plane with the lamp optical axis Ax being a center axis. The direct light B**1** forms a bundle of rays with higher light intensity than the reflection light B**2**.

The direct light B**1** and the reflection light B**2** start to intersect with each other at a position Po (see also FIG. **7**) that is at a predetermined distance in front of the front end surface **24***a* of the translucent block body **24**.

The front lens **14** is, as best seen from FIGS. **2** and **3**, disposed near the position Po at which the direct light B**1** and the reflection light B**2** start to intersect with each other. A plurality of lens elements **14***s* that are formed on the front lens **14** are disposed in a grid pattern on the rear surface of the front lens **14**. The lens elements **14***s* diffuse and deflect the light from the special LED **12** toward the lamp optical axis Ax.

Of the lens elements **14***s*, lens elements **14***s***1** located in an direct light impinging area A**1** where the direct light B**1** impinges has a diffusion angle that is set at a greater value than the diffusion angle of lens elements **14***s***2** located in a reflection light impinging area A**2** where the reflection light B**2** impinges. For example, the diffusion angle of the lens elements **14***s***1** is set at 8° in the upward, downward, left and right directions from an axis parallel to the lamp optical axis Ax, and the diffusion angle of the lens elements **14***s***2** is set at 3° in the upward, downward, left and right directions from an axis parallel to the lamp optical axis Ax.

As seen from FIG. **5**, a plurality of lens elements **14***s* are formed on the front lens **14**.

The borderline BL between the direct light impinging area A**1** and the reflection light impinging area A**2** appears in a substantially circular shape on the front lens **14**. Accordingly, some lens elements such as those referred to as the reference numerals **14***s***3** and **14***s***4** are located on the borderline BL. Accordingly, the diffusion angle of each of the lens elements **14***s***3** and **14***s***4** is set at a diffusion angle set for the lens element of the areas that correspond to either one of the direct light B**1** and the reflection light B**2** that is incident in a greater amount. More specifically, the lens elements **14***s***3** where the direct light B**1** impinges in greater amounts than the reflection light B**2** has a diffusion angle that is equal to the diffusion angle of the lens elements **14***s* **1** located in the direct light impinging area A**1**. The lens elements **14***s***4** where the reflection light B**2** impinges in greater amounts has a diffusion angle that is equal to the diffusion angle of the lens elements **14***s***2** located in the reflection light impinging area A**2**.

As described above, the vehicle lamp **10** in the shown embodiment employs the special LED **12** as the light source; and the light radiating from the LED chip **22** of the special LED **12** in directions within a predetermined range of angle with respect to the forward direction relative to the LED chip **22** is used by way of refracting the light toward the forward direction by the condenser lens **26** of the special LED **12**. Furthermore, the light radiating at great radiation angles with respect to the forward direction can also be utilized as a reflection light from the reflector **28** of the special LED **12**.

Therefore, the radiation light from the LED chip **22** is used efficiently, and the light having an increased intensity is emitted. It becomes thus possible to sufficiently provide an illumination light intensity required for a vehicle.

In the vehicle lamp **10** of the shown embodiment, the light from the special LED **12** is subjected to a diffusion deflection control by a plurality of lens elements **14***s* formed on the front lens **14** that is provided in front of the special LED **12**. Since the front lens **14** is disposed near the position Po where the direct light B**1** passing through the condenser lens **26** and the reflection light B**2** from the reflector **28** start to intersect with each other, the lamp has various advantages.

More specifically, though the direct light B**1** and the reflection light B**2** differ from each other in the direction of incidence and the intensity of light, since the front lens **14** is disposed near the position Po at which the direct light B**1** and the reflection light B**2** start to intersect with each other, the formation of an overlapped incidence area in the front lens where the overlap between the direct light B**1** and the reflection light B**2** is incident is avoided. Accordingly, it becomes possible to appropriately perform the diffusion deflection control on the light from the special LED **12** by the front lens **14**.

Furthermore, since the front lens **14** is disposed near the position Po where the direct light B**1** and the reflection light B**2** start to intersect with each other, it is possible to prevent the formation of a no-light impinging area in the front lens **14** where no light from the special LED **12** is incident. Thus, the front lens **14** appears bright over the entire surface thereof when the lamp is on, and appearance degradation of the lamp is prevented.

Thus, according to the embodiment above, it is possible to appropriately perform the diffusion deflection control on the light from the special LED **12** by means of the front lens **14** without causing any degradation in the appearance of the lamp.

As described above, the direct light B**1** has a higher light intensity than the reflection light B**2**. In the embodiment, however, of the plurality of lens elements **14***s* that are formed on the front lens **14**, the lens elements **14***s***1** positioned in the direct light impinging area A**1** has a diffusion angle that is set at a value which is greater than the diffusion angle of the lens elements **14***s***2** located in the reflection light impinging area A**2**. Accordingly, the entire front lens **14** appears substantially uniformly bright when the lamp is on, and thus the appearance of the lamp is enhanced.

In the above embodiment furthermore, the plurality of lens elements **14***s* that are formed on the front lens **14** are arranged in a grid pattern. As for the lens elements **14***s***3** and **14***s***4** that are positioned on the borderline B**1** between the direct light impinging area A**1** and the reflection light impinging area A**2** that is formed in a substantially circular shape on the front lens **14**, the diffusion angle of each one of the lens elements **14***s***3** and **14***s***4** is set at a diffusion angle which is set for the lens elements disposed in the areas where either one of the direct light B**1** and the reflection light B**2**

impinges in a greater amount. Accordingly, it becomes possible to perform sufficiently appropriate diffusion deflection control.

Modifications of the foregoing embodiment will be next described below with reference to FIGS. **6**(*a*) through **6**(*c*).

In the vehicle lamp **10** of the foregoing embodiment, a single special LED **12** is provided as a light source. In the vehicle lamp **50** in this modification, a plurality (five) of special LEDs **12** are provided.

More specifically, the special LEDs **12** are disposed linearly on one line at equal intervals in a lateral (horizontal) direction and are supported on a common printed circuit board **56**. The special LEDs **12** are disposed so that the irradiation directions are aligned to the same direction. Each special LED **12** is disposed so that the special LED **12** is long in the lateral direction as in the foregoing embodiment.

The printed circuit board **56** is, together with the special LEDs **12**, supported by a lamp body **58**. A front lens **54** is provided on the front end surface of the lamp body **58**.

The front lens **54** has a plurality of lens elements **54***s* that are disposed so as to correspond to the individual special LEDs **12** for diffusion deflection control of the light from the special LEDs **12**. The lens elements **54***s***1**, **54***s***2**, **54***s***3** and **54***s***4** that respectively correspond to the lens elements **14***s***1**, **14***s***2**, **14***s***3** and **14***s***4** of the foregoing embodiment are provided for each special LED **12**.

With the above structure in which a plural number of special LEDs **12** are disposed in the vehicle lamp **50**, the front lens **54** appear bright for a broad luminescent area.

In the vehicle lamp **50** shown in FIGS. **6**(*a*) through **6**(*c*), the special LEDs **12** are disposed linearly on one line at equal intervals in the lateral (horizontal) direction, and each special LED **12** had a substantially rectangular shape that is elongated in the lateral direction. Accordingly, this structure is applicable to a thin-type lamp suited for a high-mount stop lamp or the like.

Instead of the arrangement of the special LEDs **12** in a linear fashion in one row as in the foregoing modification, a plurality of special LEDs **12** can be disposed linearly in a plurality of rows. Furthermore, a plurality of special LEDs **12** can be disposed in one or more rows in an arc or wave shape.

What is claimed is:

1. A vehicle lamp comprising a special LED, which is a light source, and a front lens, which is provided in front of the special LED and performs a diffusion deflection control of light from the special LED by a plurality of lens elements formed on the front lens, wherein

the special LED comprises:

a translucent block body,

an LED chip embedded in the translucent block body,

a condenser lens protruded in a substantially semi-spherical shape on a front end surface of the translucent block body and positioned in front of the LED chip, and

a reflector provided inside the translucent block body and forwardly reflects light that is originated from the LED chip and reflected by a portion of the front end surface of the translucent block body that is a peripheral area of the condenser lens, and wherein

the front lens is disposed near a position where direct light passing through the condenser lens and reflection light from the reflector start to intersect with each other.

2. The vehicle lamp according to claim **1**, wherein of the plurality of lens elements formed on the front lens, a lens element positioned in a direct light impinging area where the direct light impinges has a diffusion angle that is set at a value which is greater than a diffusion angle of a lens element positioned in a reflection light impinging area where the reflection light impinges.

3. The vehicle lamp according to claim **2**, wherein:

the plurality of lens elements are disposed in a grid pattern, and

the diffusion angle of a lens element positioned on a borderline between the direct light impinging area and the reflection light impinging area is set at a diffusion angle that is set for a lens element which is set for a greater impinging amount between the direct light and the reflection light.

4. The vehicle lamp according to claim **3**, wherein:

a plurality of special LEDs are disposed in a manner that the special LEDs have an aligned irradiation direction, and

the front lens is formed with a plurality of lens elements that perform a diffusion deflection control of light from the special LEDs for each one of the special LEDs.

5. The vehicle lamp according to claim **4**, wherein a plurality of special LEDs are disposed in a row, and each of the special LEDs has a substantially rectangular shape that is elongated in a direction of the row arrangement of the LEDs.

6. The vehicle lamp according to claim **1**, wherein:

a plurality of special LEDs are disposed in a manner that the special LEDs have an aligned irradiation direction, and

the front lens is formed with a plurality of lens elements that perform a diffusion deflection control of light from the special LEDs for each one of the special LEDs.

7. The vehicle lamp according to claim **6**, wherein a plurality of special LEDs are disposed in a row, and each of the special LEDs has a substantially rectangular shape that is elongated in a direction of the row arrangement of the LEDs.

8. The vehicle lamp according to claim **2**, wherein:

a plurality of special LEDs are disposed in a manner that the special LEDs have an aligned irradiation direction, and

the front lens is formed with a plurality of lens elements that perform a diffusion deflection control of light from the special LEDs for each one of the special LEDs.

9. The vehicle lamp according to claim **8**, wherein a plurality of special LEDs are disposed in a row, and each of the special LEDs has a substantially rectangular shape that is elongated in a direction of the row arrangement of the LEDs.

* * * * *

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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/014,815	07/30/2021	9955551

CONFIRMATION NO. 6654

REEXAM ASSIGNMENT NOTICE

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OC000000127600898

Date Mailed: 08/11/2021

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3992. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

NOTICE OF USPTO EX PARTE REEXAMINATION PATENT OWNER STATEMENT WAIVER PROGRAM

The USPTO has implemented a pilot program where, after a reexamination proceeding has been granted a filing date and before the examiner begins his or her review, the patent owner may orally waive the right to file a patent owner's statement. See *"Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings,"* 75 FR 47269 (August 5, 2010). One goal of the pilot program is to reduce the pendency of reexamination proceedings and improve the efficiency of the reexamination process.

Ordinarily when ex parte reexamination is ordered, the USPTO must wait until after the receipt of the patent owner's statement and the third party requester's reply, or after the expiration of the time period for filing the statement and reply (a period that can be as long as 5 to 6 months), before mailing a first determination of patentability. The USPTO's first determination of patentability is usually a first Office action on the merits or a Notice of Intent to Issue Reexamination Certificate (NIRC).

Under the pilot program, the patent owner's oral waiver allows the USPTO to act on the first determination of patentability immediately after determining that reexamination will be ordered, and in a suitable case issue the reexamination order and the first determination of patentability (which could be a NIRC if the claims under reexamination are confirmed) at the same time.

Benefits to the Patent Owner for participating in this pilot program include reduction in pendency.

To participate in this pilot program, Patent Owners may contact the USPTO's Central Reexamination Unit (CRU) at 571-272-7705. The USPTO will make the oral waiver of record in the reexamination file in an interview summary and a copy will be mailed to the patent owner and any third party requester.

cc: Third Party Requester(if any)

,

/pavolpe/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/014,815	07/30/2021	9955551

CONFIRMATION NO. 6654

REEXAMINATION REQUEST NOTICE

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OC000000127600896

Date Mailed: 08/11/2021

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Patent Owner Requester)

Requester is hereby notified that the filing date of the request for reexamination is 07/30/2021, the date the required fee was received. (See CFR 1.510(d)).

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

Pursuant to 37 CFR 1.33(c), future correspondence in this reexamination proceeding will be with the latest attorney or agent of the record in the patent file.

The paragraphs checked below are part of this communication:

___ 1. The party receiving the courtesy copy is the latest attorney or agent of record in the patent file.

___ 2. The person named to receive the correspondence in this proceeding has not been made the latest attorney or agent of record in the patent file because:

___ A. Requester's claim of ownership of the patent is not verified by the record.

___ B. The request papers are not signed with a real or apparent binding signature.

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___ 4. Other _____

/pavolpe/

_____

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

Litigation Search Report CRU 3999

Reexamination Control No. 90/014,815

To:	TRAN, Henry	**From:**	GRAVES, Monica A.
Location:	OCRU	**Location:**	OCRU
Art Unit:	3992	**Phone:**	2-7253
Date:	14 August 2021	**E-mail:**	monica.graves@uspto.gov

Search Notes

US PATENT NO: 9,955,551 - No litigation found.

1. Performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.
2. Performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.
3. Performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.
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5. Performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

Paper No. 20210814

Citing References (32)

Treatment	Title	Date	Type	Depth	Headnote(s)
—	**1. SOLID-STATE ILLUMINATING DEVICE FOR USE AS AUTOMATED IRRADIATION DEVICE UTILIZED FOR E.G. GENERAL AND SPECIALITY LIGHTING APPLICATIONS, HAS PROCESSOR PROCESSING SENSED INFORMATION AND DETERMINING ILLUMINATION REQUIREMENTS OF OBJECTS** Out Of Plan DWPI 2012-K77717 ... International Classes (IPC 8):F21S-4/00 International Classes (IPC 1-7):F21S-4/00 Language:English First Derwent Appearance:2016.20 Publication No. (Derwent): US 9955551 B2 Original Title (English):DETECTOR CONTROLLED ILLUMINATING SYSTEM Publication Date:2018-04-24 Application No.:US 357549 Application Date:2012-01-24 Inventor(s ...	July 12, 2002	DWPI	—	—
—	**2. VEHICLE HEADLIGHT BEAM SYSTEM FOR PROVIDING REQUIRED ILLUMINATION TO ENTITIES IN FIELD-OF-VIEW AHEAD OF OPERATOR OR CAMERA-VISION SYSTEM, HAS LOGICAL-CONTROLLER THAT PROCESSES ALGORITHMS AND SENSOR DATA TO DETERMINE REQUIRED ILLUMINATION** Out Of Plan DWPI 2018-692987+ ... 604360 2003-07-14 Application priority US 395308P 2002-07-12 Application priority Earliest Priority Date:2002-07-12 Related:Continuation of US patent number US 9955551 B Continuation In Part of US patent US 8100552 B Previously issued patent number US 2018255622 A Continuation In Part of US patent US ...	July 12, 2002	DWPI	—	—
—	**3. ADAPTIVE HEAD LIGHT SYSTEM FOR MOTOR VEHICLE, HAS PROCESSORS AND MEMORY INSTRUCTIONS TO CONTROL FIRST SEVERAL LED LIGHT SOURCES TO PROVIDE LIGHT BASED ON DETERMINED LIGHT CHANGE AND PRIOR TO MOTOR VEHICLE REACHING ROAD CURVATURE** Out Of Plan DWPI 2021-59687R ... 2002-07-12 Application priority Earliest Priority Date:2002-07-12 Related:Continuation of US patent number US 10894503 B Continuation of US patent number US 9955551 B Continuation In Part of US patent US 8100552 B No. of Countries:1 No. of Patents:1 First Derwent Appearance:2021.051 Latest ...	July 12, 2002	DWPI	—	—
—	**4. PatStat 9955551** ... Patent Status File Patent Number: US 9955551 Change Code: REA Description: Reissue Application Filed Reissue Number:OG Date: 06/02/2020 ...	June 02, 2020	Patent Status Files	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**5. CIRCADIAN RHYTHMS ENTRAINMENT ENHANCEMENT DEVICE** Out Of Plan US PAT 11071187 , U.S. PTO Utility A circadian entrainment enhancement device includes a housing, a first directional light source, a second directional light source, and a driver. During daytime, the driver turns... ... English References Cited US Patents and Applications:US United States US 9854640 B2 2017/12 Hsia H05B 45/60 cited by examiner US United States US 9955551 B2 2018/04 Spero F21S 4/28 cited by examiner US United States US 10420185 B2 2019/09 Biery H05B 47/19 cited by ...	July 20, 2021	Patents	—	—
—	**6. DETECTOR CONTROLLED HEADLIGHT SYSTEM** Out Of Plan US PAT 10894503+ , U.S. PTO Utility An automated headlight system for vehicles replaces the high and low beam with a continuum of beam patterns, with further variable spatial distribution of intensities and color... ... X Tung X Le 2844 Priority Information Related Information:This application is a Continuation of Application No. 13/357,549, filed on 2012/01/24, now Patent No. 9,955,551 US US which is a Continuation-in-part of Application No. 10/604,360, filed on 2003/07/14, now Patent No. 8,100,552 which ...	Jan. 19, 2021	Patents	—	—
—	**7. CORDLESS LED HEADLIGHT AND CONTROL THEREOF** Out Of Plan US PAT 10851981 , U.S. PTO Utility A wireless headlight assembly for attachment to an eyewear frame is disclosed. The wireless headlight assembly comprises a battery pod containing a battery connected to an... ... Feinbloom F21V 23/0471 cited by examiner US United States US 9894733 B1 2018/02 Buthker H05B 47/155 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 10132483 B1 2018/11 Feinbloom F21V 23/0471 cited by ...	Dec. 01, 2020	Patents	—	—
—	**8. METHOD OF LIVESTOCK REARING AND A LIVESTOCK SHED** Out Of Plan US PAT 10813191 , U.S. PTO Utility A method of rearing chickens comprises providing a chicken shed (10) having a floor area (12) over which the chickens can move freely. The shed (10) is provided with a plurality of... ... Noble H04N 7/00 cited by examiner US United States US 9807983 B2 2017/11 Yuki A01K 29/005 cited by examiner US United States US 9955551 B2 2018/04 Spero F21K 9/23 cited by examiner US United States US 2004/0158174 A1 2004/08 Tasch 600/587 A61B 5 ...	Oct. 20, 2020	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**9. SYSTEM AND METHOD FOR THE OPTIMIZATION OF RADIANCE MODELLING AND CONTROLS IN PREDICTIVE DAYLIGHT HARVESTING** Out Of Plan US PAT 10785849 , U.S. PTO Utility In an example, an expected sky condition is calculated for a geographic location, a time of day, and a date based on a mathematical model. A predicted distribution of direct and... ... Kumar G06T 7/194 cited by examiner US United States US 9836557 B2 2017/12 Marceau G06F 30/20 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 9955552 B2 2018/04 Ashdown G05B 13/048 cited by ...	Sep. 22, 2020	Patents	—	—
—	**10. MOTOR VEHICLE** Out Of Plan US PAT 10759341 , U.S. PTO Utility A motor vehicle has a central light control unit, a plurality of peripheral light control units distributed within the vehicle, and a plurality of interior light modules, each of... ... 0842 cited by examiner US United States US 8924087 B2 2014/12 Heberer 340/005.72 E05B 77/02 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 10195987 B2 2019/02 Berlitz B60Q 3/54 cited by ...	Sep. 01, 2020	Patents	—	—
—	**11. LIGHTING FIXTURE CONFIGURED TO PROVIDE MULTIPLE LIGHTING EFFECTS** Out Of Plan US PAT 10728979 , U.S. PTO Utility A lighting fixture may provide a proximal lighting effect and a distal lighting effect. In some cases, the lighting fixture may include a multi-channel driver and multiple groups... ... van de Ven et al.cited by applicant US United States US 9913343 B1 2018/03 Ciccarelli et al.cited by applicant US United States US 9955551 B2 2018/04 Spero cited by applicant US United States US 10091856 B2 2018/10 Ciccarelli et al.cited by applicant US United States ...	July 28, 2020	Patents	—	—
—	**12. LIGHTING CONTROL CONFIGURATION** Out Of Plan US PAT 10667346 , U.S. PTO Utility A method for configuring a lighting system including one or more sensors for controlling one or more lighting units for providing illumination of an area. The method allows a... ... Chalmers F21V 29/77 cited by examiner US United States US 9610063 B2 2017/04 Foroughi A61B 8/4245 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 2013/0145610 A1 2013/06 Feri et al.cited by ...	May 26, 2020	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**13. INFRARED BASED CONTROLLER FOR RGB LAMP STRIP** Out Of Plan US PAT 10624181 , U.S. PTO Utility The present disclosure discloses an infrared based controller for a RGB lamp strip disposed between a power source and the lamp strip. The controller comprises a first reverse... ... Recker H05B 37/0272 cited by examiner US United States US 9867263 B2 2018/01 Avrahamy H05B 39/086 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 10034359 B2 2018/07 Recker H05B 37/0272 cited by ...	Apr. 14, 2020	Patents	—	—
—	**14. PHOTOGRAPHY ENVIRONMENT CONTROL** Out Of Plan US PAT 10574876 , U.S. PTO Utility In implementations of photography environment control, an environment controller is a device that maintains a photography environment map of an environment in which images are... ... Lo H04N 5/2354 cited by examiner US United States US 9942970 B2 2018/04 Green H05B 37/029 cited by examiner US United States US 9955551 B2 2018/04 Spero F21S 41/143 cited by examiner US United States US 9986140 B2 2018/05 Collins H04N 5/2256 cited by ...	Feb. 25, 2020	Patents	—	—
—	**15. RADIANT HEATING SYSTEM INCORPORATING STEERING WHEEL POSITION MONITORING DEVICE** Out Of Plan US PAT 10532629 , U.S. PTO Utility A radiant heating system includes a radiant heating element, a steering wheel position monitoring device and a controller configured to control the radiant heating element in... ... 148 B60R 1/04 cited by examiner US United States US 9873308 B2 2018/01 Moench B60H 1/00742 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 9963013 B2 2018/05 Satzger B60H 1/2218 cited by ...	Jan. 14, 2020	Patents	—	—
—	**16. SMART LIGHTING SYSTEM** Out Of Plan US PAT 10524331 , U.S. PTO Utility According to at least one embodiment, a computer-implemented method to illuminate a room is described. At least one person entering the room may be identified. The room may be... ... 05 Recker et al.cited by applicant US United States US 9791872 B2 2017/10 Wang G05D 23/1927 cited by examiner US United States US 9955551 B2 2018/04 Spero cited by applicant US United States US 9983011 B2 2018/05 Mountain cited by applicant US United States US 10206264 ...	Dec. 31, 2019	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**17. LIGHT FIXTURES AND METHODS** Out Of Plan US PAT 10502374 , U.S. PTO Utility A light fixture, e.g., as an artificial skylight, in which light within a region defined by x, y color coordinates (0.37, 0.34), (0.35, 0.38), (0.15, 0.20), and (0.20, 0.14) exits... ... de Ven et al.cited by applicant US United States US 9915775 B2 2018/03 Krames G02B 6/0073 cited by examiner US United States US 9955551 B2 2018/04 Spero F21S 41/143 cited by examiner US United States US 2007/0139920 A1 2007/06 Van De Ven 362/235 ...	Dec. 10, 2019	Patents	—	—
—	**18. STREET LIGHT SYSTEM AND OPERATION METHOD THEREOF** Out Of Plan US PAT 10506687 , U.S. PTO Utility A street light system and operation method thereof are provided. The street light system includes a master street light device and a slave street light device. The master street... ... 01 Hubbell 362/293 F21S 8/088 cited by examiner US United States US 9900960 B1 2018/02 Lin cited by applicant US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 10234129 B2 2019/03 Oostdyk F21V 29/83 cited by ...	Dec. 10, 2019	Patents	—	—
—	**19. PHOTOGRAPHY LIGHTING CONTROL** Out Of Plan US PAT 10469723 , U.S. PTO Utility In implementations of photography lighting control, a camera device includes a camera to capture an image of a subject in an environment. The camera device implements an image... ... 9225910 B2 2015/12 Lo cited by applicant US United States US 9942970 B2 2018/04 Green et al.cited by applicant US United States US 9955551 B2 2018/04 Spero cited by applicant US United States US 9986140 B2 2018/05 Collins et al.cited by applicant US United States ...	Nov. 05, 2019	Patents	—	—
—	**20. SYSTEM AND METHOD OF DYNAMIC COLOR ADJUSTMENT** Out Of Plan US PAT 10462875 , U.S. PTO Utility A method for controlling a chromaticity of total light provided by a lighting system includes detecting the total light by a sensor system, determining a component of the total... ... 149 H05B 33/0818 cited by examiner US United States US 9521721 B2 2016/12 Beczkowski H05B 33/0866 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 9974141 B2 2018/05 Simonian H05B 33/0872 cited by ...	Oct. 29, 2019	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**21. STREET LIGHT DEVICE AND OPERATION METHOD THEREOF** Out Of Plan US PAT 10405399 , U.S. PTO Utility A street light device includes a light emitting module, a driving circuit, a sensing module, and a microcontroller. The light emitting module includes a first light emitting unit... ... 293 F21S 8/088 cited by examiner US United States US 9900960 B1 2018/02 Lin H05B 33/0857 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 10234129 B2 2019/03 Oostdyk F21V 29/83 cited by ...	Sep. 03, 2019	Patents	—	—
—	**22. LIGHTING APPARATUS INCLUDING PRIMARY AND SECONDARY ILLUMINATION SOURCES AND CIRCUIT CONTROLLING THE SAME** Out Of Plan US PAT 10309596 , U.S. PTO Utility A lighting apparatus is provided that is able to illuminate despite the loss of a primary source of power. In implementation, a controller is provided for determining if a loss of... ... 172 H05B 33/0803 cited by examiner US United States US 9078313 B2 2015/07 Recker H05B 33/0815 cited by examiner US United States US 9955551 B2 2018/04 Spero F21S 41/143 cited by examiner US United States US 2002/0047627 A1 2002/04 Pickering 315/291 H02J 9 ...	June 04, 2019	Patents	—	—
—	**23. INTELLIGENT LUMINAIRE** Out Of Plan US PAT 10314144 , U.S. PTO Utility A luminaire comprising: at least one light source for emitting light to illuminate an environment; an optical sensor comprising an array of photodetectors, the sensor configured to... ... 231 B60Q 1/04 cited by examiner US United States US 9756706 B2 2017/09 Breuer H05B 37/0272 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 2012/0019663 A1 2012/01 Raynor cited by applicant US ...	June 04, 2019	Patents	—	—
—	**24. SYNCHRONIZING ACTION EXECUTION ACROSS NETWORKED NODES USING RELATIVE TIME** Out Of Plan US PAT 10305994 , U.S. PTO Utility A way of synchronizing action execution across networked nodes using relative time. A command and a first time value can be received at a first networked device, where the first... ... 11 Nagatsuka et al.cited by applicant US United States US 9860965 B2 2018/01 Recker H05B 37/0272 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 10075334 B1 2018/09 Kozura H04L 41/0806 cited by ...	May 28, 2019	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**25. SYSTEM AND METHOD FOR THE OPTIMIZATION OF RADIANCE MODELLING AND CONTROLS IN PREDICTIVE DAYLIGHT HARVESTING** Cut Of Pen US PAT 10289094 , U.S. PTO Utility In an example, an expected sky condition is calculated for a geographic location, a time of day, and a date based on a mathematical model. A predicted distribution of direct and... ... Kumar G06T 7/194 cited by examiner US United States US 9836557 B2 2017/12 Marceau G06F 17/5004 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 9955552 B2 2018/04 Ashdown H05B 37/0227 cited by ...	May 14, 2019	Patents	—	—
—	**26. SYSTEM AND METHOD FOR REAL TIME DYNAMIC LIGHTING SIMULATION** Cut Of Pen US PAT 10290148 , U.S. PTO Utility Sustainable building lighting and energy modelling and control, and the associated computer graphics, including real-time dynamic lighting simulation, are concerned with: an... ... US 9734433 B1 2017/08 Mysore Vijaya cited by applicant US United States US 9836557 B2 2017/12 Marceau cited by applicant US United States US 9955551 B2 2018/04 Spero cited by applicant US United States US 2005/0041024 A1 2005/02 Green cited by applicant US United States US ...	May 14, 2019	Patents	—	—
—	**27. SYSTEMS AND METHODS OF ILLUMINATION** Cut Of Pen US PAT 10240751 , U.S. PTO Utility One or more techniques and/or systems are disclosed for illuminating a target area. Such systems may mitigate shadows and lack of light homogeneity at surgical intervention... ... Elfring F21V 23/0471 cited by examiner US United States US 9587804 B2 2017/03 Chen F21V 14/02 cited by examiner US United States US 9955551 B2 2018/04 Spero F21S 41/143 cited by examiner Abstract One or more techniques and/or systems are disclosed for illuminating a target ...	Mar. 26, 2019	Patents	—	—
—	**28. SMART LIGHTING SYSTEM** Cut Of Pen US PAT 10206264 , U.S. PTO Utility According to at least one embodiment, a computer-implemented method to illuminate a room is described. At least one person entering the room may be identified. The room may be... ... 628 F24F 11/30 cited by examiner US United States US 9655217 B2 2017/05 Recker H05B 37/0272 cited by examiner US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 9963011 B2 2018/05 Mountain G01C 21/206 cited by ...	Feb. 12, 2019	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**29. METHOD FOR CONTROLLING A TUNABLE WHITE FIXTURE USING A SINGLE HANDLE** Out Of Plan US PAT 10187952 , U.S. PTO Utility A system allows a light fixture to have a wider range of color temperatures (CCT) while limiting the warmest temperature reached at full intensity. The CCT of the light output may... ... de Ven F21V 29/74 cited by examiner US United States US 9913343 B1 2018/03 Ciccarelli et al.cited by applicant US United States US 9955551 B2 2018/04 Spero B60Q 1/04 cited by examiner US United States US 2008/0094000 A1 2008/04 Yamamoto et al.cited by ...	Jan. 22, 2019	Patents	—	—
—	**30. LIGHT EMITTING DIODE DRIVER FOR LOAD CHANGES** Out Of Plan US PAT 10085314 , U.S. PTO Utility A device for regulating a voltage includes a first branch switch, a second branch switch, and a control module. The control module is configured to determine an instruction to... ... 09 Milanesi et al.cited by applicant US United States US 9820343 B1 2017/11 Fragiacomo B60Q 1/04 cited by examiner US United States US 9955551 B2 2018/04 Spero F21S 41/143 cited by examiner US United States US 2016/0227616 A1 2016/08 Lee H05B 33/0815 cited ...	Sep. 25, 2018	Patents	—	—
—	**31. ADAPTIVE HEADLIGHT SYSTEM** Out Of Plan US PAT APP 20210162912+ , U.S. PTO Application A motor vehicle includes headlamps having a plurality of LED light sources, one or more processors, and a memory storing instructions. One or more processors executing the... ... on 2018/04/24, now Patent No. 10,894,503 US US which is a Continuation of Application No. 13/357,549, filed on 2012/01/24, now Patent No. 9,955,551 US US which is a Continuation-in-part of Application No. 10/604,360, filed on 2003/07/14, now Patent No. 8,100,552 which ...	June 03, 2021	Patents	—	—
—	**32. DETECTOR CONTROLLED HEADLIGHT SYSTEM** Out Of Plan US PAT APP 20180255622 , U.S. PTO Application An automated headlight system for vehicles replaces the high and low beam with a continuum of beam patterns, with further variable spatial distribution of intensities and color... ... individual Tifrach, Israel Tifrach Israel Priority Information Related Information:This application is a Continuation of Application No. 13/357,549, filed on 2012/01/24, now Patent No. 9,955,551 US US which is a Continuation-in-part of Application No. 10/604,360, filed on 2003/07/14, now Patent No. 8,100,552 which ...	Sep. 06, 2018	Patents	—	—

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BIB DATA SHEET

CONFIRMATION NO. 6654

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/014,815	07/30/2021 RULE	315	3992	TRCH0102RX

APPLICANTS

INVENTORS

9955551B2, Residence Not Provided;
YECHEZKAL EVAN SPERO, MOSHAV TIFACH, ISRAEL;
PATENT OWNER, Residence Not Provided;

**** CONTINUING DATA ***************************

This application is a REX of 13/357,549 01/24/2012 PAT 9955551 *
which claims benefit of 61/535,981 09/17/2011
and is a CIP of 10/604,360 07/14/2003 PAT 8100552
which claims benefit of 60/395,308 07/12/2002
(*)Data provided by applicant is not consistent with PTO records.

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

Foreign Priority claimed ☐ Yes ☐ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged _____ Examiner's Signature	☐ Met after Allowance _____ Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
				23	4

ADDRESS

Brooks Kushman
1000 Town Center
22nd Floor
Southfield, MI 48075
UNITED STATES

TITLE

Detector Controlled Illuminating System

FILING FEE RECEIVED	FEES: Authority has been given in Paper	☐ All Fees
12600	No._____ to charge/credit DEPOSIT ACCOUNT	☐ 1.16 Fees (Filing)
	No._____ for following:	☐ 1.17 Fees (Processing Ext. of time)
		☐ 1.18 Fees (Issue)
		☐ Other _____
		☐ Credit

REEXAMINATION TITLE REPORT (AKA PATENT ASSIGNMENT ABSTRACT OF TITLE)

TYPE OF REEXAMINATION: XX EX PARTE *INTER PARTES*

REEXAM CONTROL NO.: 90/014,815

SERIAL NUMBER : 13/357,549 FILING DATE 01/24/2012

PATENT NUMBER: 9,955,551 ISSUE DATE 04/24/2018

FIRST *THREE* INVENTORS' NAMES: YECHEZKAL E. SPERO

ET. AL?: Y XN

CONTINUITY DATA (IF ANY) :

__ THIS IS (OR) A CON __DIV CIP A PROVISIONAL APPLICATION ___OTHER OF SERIAL NUMBER FILED ON . STATUS: PATENTED WITH PATENT NUMBER OR__PENDING, OR XABANDONED (*EXPIRED* FOR PROVISIONALS).

__ WHICH IS A CON, DIV, CIP, PROVISIONAL, OR ___OTHER, OF SERIAL NUMBER FILED ON. STATUS: PATENTED, WITH PATENT NUMBER AND SERIAL NUMBER FILED PENDING, OR ABANDONED.

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X__WHICH IS A CIP OF SERIAL NUMBER 10/604,360 FILED ON 07/14/2003. STATUS: PATENTED, WITH PATENT NUMBER 8,100,552.

ET AL

ASSIGNMENT RECORD DATA

THE ASSIGNMENT RECORDS REVEAL THAT THE TITLE REPORT APPEARS TO BE VESTED IN:

xxxINVENTOR(S): TIFRACH ISRAEL

___AS ENDORSED:

___AS THE RECORD STANDS, THE PATENT WHEN GRANTED WILL ISSUE IN THE NAME OF THE INVENTOR(S)

___LEGAL REPRESENTATIVE:

___SECURITY ASSIGNMENT/LICENSEE(PLEASE NOTE THAT THE OWNERSHIP OF THE PATENT IS STILL REFLECTED IN THE *ASSIGNOR*. THE *ASSIGNEE* IN THIS CASE CANNOT OWN THE PATENT. (SEE ACCOMPANYING PAGES, IF ANY.)

___WHEN THE ASSIGNMENT IS RECORDED, THE PATENT SHOULD BELONG TO:

___OTHER: REEL NO: FRAME NO.: DATE RECORDED: // COMPANY NAME: CITY AND STATE OR COUNTRY: .

___NOTES/COMMENTS: Please see section 306 of the Manual of Patent Examining Procedure regarding the *Assignment of a Division, Continuation, Substitute, and Continuation-in-Part in Relation to Parent Application.*

EXAMINED UP TO AND INCLUDING THIS CERTIFICATE DATED AND SIGNED: 08/20/2021

LEGAL INSTRUMENTS EXMR., OFFICE OF PATENT LEGAL ADMIN., CENTRAL REEXAMINATION UNIT

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,815	07/30/2021	9955551B2	TRCH0102RX	6654

22045 7590 09/20/2021

Brooks Kushman
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EXAMINER	
TRAN, HENRY N	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
09/20/2021	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Order Granting Request For Ex Parte Reexamination	Control No. 90/014,815	Patent Under Reexamination 9955551	
	Examiner Henry Tran	Art Unit 3992	AIA (FITF) Status No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed 07/30/2021 has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☑ PTO-892, b)☐ PTO/SB/08, c)☐ Other: ____

1. ☑ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

/HENRY N TRAN/ Primary Examiner, Art Unit 3992	/ANGELA M LIE/ Primary Examiner, Art Unit 3992	

cc:Requester (if third party requester)

I. DECISION ON REQUEST

1. A substantial new question (SNQ) of patentability affecting claim 6 of U.S. Patent No. 9,955,551 B2 issued on April 24, 2018 to Yechezkal Evan Spero entitled "DETECTOR CONTROLLED ILLUMINATING SYSTEM" ("the '551 patent") are raised by the Request for *Ex Parte* Reexamination of claim 6 of the '551 patent under 35 U.S.C. § 302 and 37 C.F.R. § 1.510 filed on July 30, 2021 ("the Request") by the Patent Owner ("Requester").

2. For the reasons set forth below, the Examiner has determined that the prior art patents and printed publication cited in the Request raise a SNQ of patentability regarding claim 6 of the '551 patent. Therefore, the Request is GRANTED. Claim 6 will be reexamined.

3. Under 37 C.F.R. § 1.510 (e), the Patent Owner filed with the Request a proposed amendment in accordance with § 1.530 for adding new claims 24-87. MPEP § 2221 states "The decision on the Request will be made on the basis of the patent claims as though the proposed amendment had not been presented. However, if the request for reexamination is granted, all subsequent reexamination prosecution and examination should be on the basis of the claims as amended. Accordingly, since the request for reexamination of claim 6 is granted by this order, the '551 patent claim 6 and newly added claims 24-87 will be reexamed and/or examed.

II. THE REQUEST

1. Cited Prior Art References

The prior art patents and printed publications, or non-prior art patents under 37 CFR 1.510(b)(3), see form PTO/SB/08a, submitted with the Request and cited in the proposed rejections, see also pages i, 12, and 20 of the Request, are re-listed as follows.

(1) WO 01/70538 A2 filed on March 20, 2001 (PCT/US01/08912) by Stam et al., and is published on September 27, 2001, (hereinafter "**Stam et al.**", or "**Stam PCT**"), (Ex. PA-A).

(2) U.S. Pat. No. 6,406,172 B1 issued on Jun. 148, 2002 to Harbers et al. (hereinafter "**Harbers**" or "**the '172 patent**"), (Ex. PA-B).

None of the above-identified prior art patent and printed publication were considered during prosecution of the '551 patent.

2. Other exhibits and supporting documents

Other exhibits and supporting documents, i.e., OTH-A through OTH-H and Exhibits 1 through 11 or evidence under 37 CFR 1.510(b)(3), see pages iii-v of the Request, submitted with the Request for providing explanation supports of the Requester's SNQ of patentability, newly added claims, and/or the pertinency and manner of applying the cited prior art references to claim 6 for which reexamination is requested, or the '551 patent prosecution history, are hereby acknowledged and fully considered as appropriate.

3. Substantial New Question (SNQ) of Patentability

Under rule 37 CFR 1.510 (b)(1), the Request, see page i and pages 35, identified the following substantial new question (SNQ) of patentability.

SNQ: **The Stam PCT and Harbers combination raises a SNQ of patentability regarding claim 6 of the '551 patent.**

4. Proposed Rejections

Under rule 37 CFR 1.510 (b)(2), the Request identified the following proposed grounds of rejection of claim 6 of the '551 patent for supporting the SNQ. Particularly, Stam PCT and Harbers, each teaches certain limitations of the '551 patent claim 6; and thus, the combination of Stam PCT and Harbers raises a substantial new question of patentability of claim 6, see pages 36-37.

III. THE '551 PATENT AND ITS PROSECUTION HISTORY

1. The '551 patent related applications

- The '551 patent, entitled "Detector Controlled Illuminating System," issued on April 24, 2018 to inventor Yechezkal Evan Spero and is unassigned.
- U.S. Patent Application which led to the '551 patent is the U.S. patent application No. 13/357,549 ("the '549 app"), which was filed on January 24, 2012, and is a continuation-in-part of application No. 10/604,360 filed on Jul. 14, 2003, now U.S. Patent No. 8,100,552 (parent patent) with a priority date of July 12, 2002. (Ex. PAT-A).
- U.S. Patent Application 15/961,861 filed on April 24, 2018, now U.S. Patent No. 10,894,503 issued on January 19, 2021 is a continuation of the '551 patent.
- U.S. Patent Application 16/858,342 filed on April 24, 2020 is a broadening reissue application of the '551 patent and is currently pending. This broadening reissue application currently includes a total of 44 claims, including claim 6 of the original '551 patent, which is also included in this reexamination request. Accordingly, If this request for ex parte reexamination results in a determination and order for ex parte reexamination under 35 U.S.C. § 1.525, it will result in concurrent office proceedings. Merger of the reissue and ex parte reexamination proceedings will be considered as appropriate. 37 C.F.R. § 1.565 and MPEP § 2285.

▪ U.S. Patent Application 17/152,399 filed on Jan. 19, 2021, which is a continuation of U.S. Patent No. 10,894,503, is pending.

2. The '551 patent

The '551 patent relates to an illuminating device (system) coupled with sensors or an image acquisition device and a logical controller allows illumination intensity and spectrum to be varied according to changing user needs. The device provides illumination to areas according to the principles of correct lighting practice for the optimal performance of visual tasks in the most efficient, cost effective manner. Aspects of the invention include lighting fixtures, which adapt to ambient lighting, movement, visual tasks being performed, and environmental and personal conditions affecting illumination requirements at any given instant. Lighting fixtures having spatial distribution of spectrum and intensity, providing both "background" room lighting, and "task" lighting. See Abstract, Figs. e.g., 1, 12, 15, 22, and 29-32, col. 13:10-23, and col. 45:45 to col. 46:37.

3. Prosecution history of the '551 patent

A brief summary of the most relevant portions of the '549 app prosecution is as follows.

● On August 15, 2016, a Non-Final Rejection was sent out, *inter alia*, rejecting claims 1, 2, 5-7, 19, 21 and 25, objecting claims 3, 4, 20, and 22-24, and indicating claims 8-18 allowable. Particularly, claims 1, 2, 5-7, 19, 21 and 25, including claim 6, were rejected under pre-AIA 35 U.S.C. § 102(e) as being anticipated by Kuhlman et al. (US 2012/0287493).

● On January 16, 2017 and August 1, 2017, Applicant filed Amendments and pointed out that: (i) the Kuhlman et al. reference (US 2012/0287493) is a disqualified prior art reference under 35 U.S.C. § 102 because it was filed on May 12, 2011, which is after the '551 patent's priority date of July 14, 2003, which is the filing date of the '551 patent's parent patent (U.S. Patent No. 8,100,552), see pages 9-12 of the Jan. 16, 2017 Amendment; and (ii) with respect to claim 6, Figs. 12, 18, 20A, 22 and 31 and ¶s [0183] and [0308] of the '549 app disclosure describe the limitations of claim 6, see pages 9-10 of the August 1, 2017 Amendment, which are not taught by Kuhlman.

● On August 11, 2017, a Final Office action was sent out, *inter alia*, rejecting claims 19 and 25, objecting claims 20-24, and indicating claims 1-18 allowable. The Examiner's reasons for allowance of claims 1-18 was provided in the previous Office actions, see pages 4-5 of the August 11, 2017 Office action, pages 5-6 of the Office action mailed on May 1, 2017, and pages 7-8 of the Office action mailed on August 15, 2016.

● On November 13, 2017, Applicant filed an AF amendments maintaining original claims 1-18 and 21, canceling claims 20 and 25, amending claims 19 and 22-24 to include the allowable subject matters recited in claim 20, and arguing that the rejections of claims 19 and 25 under Pre-AIA 35 USC 102(e) as being anticipated by Mueller et al. (US 2004/0052076) have been overcome, see page 10 of the November 13, 2017 AF amendment.

● On December 19, 2017, a Notice of Allowance was sent out indicating that all pending claims 1-19 and 21-24 are allowed and providing the reasons for allowance of claims 19 and 21-24, and indicating the reasons for allowance of claims 1-18 were provided in the previous office action subject matter, see pages 2-3 of the December 19, 2017 Notice of Allowance.

● On April 24, 2018, the '549 app was issued as the '551 patent having a total of 23 claims. Of which, claims 1, 6, 8, and 19 are independent claims. See the '551 patent claims. Ex. PAT-A. Accordingly, based on the prosecution history of the '551 patent, and with respect to claim 6, the claim is allowable because the closest prior art references, i.e., Kuhlman et al. (US 2012/0287493) and/or Mueller et al. (US 2004/0052076), are either disqualified as a prior art reference or fail to teach or suggest one or more of the following elements and/or limitations "a structure", "one or more light sources", "electronic circuitry apparatus", "one or more cameras placed on the structure for detecting coordinate-specific information about the illuminated area", and "a controller" recited in claim 6.

● The '551 patent base **claim 6** is repeated below.

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 [sic] processes the information communicated from the camera and automatically control the light provided to the illuminated area.

IV. ANALYSIS OF THE SNQ

1. Criteria for Deciding Ex Parte Reexamination Request Filed under 35 U.S.C. § 302

● The presence or absence of "a substantial new question of patentability" determines whether or not reexamination is ordered.

● For "a substantial new question of patentability" to be present, it is only necessary that: (A) the prior art patents and/or printed publications raise a substantial question of patentability regarding at least one claim, i.e., the teaching of the (prior art) patents and printed publications is such that a reasonable examiner would consider the teaching to be important in deciding whether or not the claim is patentable; and (B) the same question of patentability as to the claim has not been decided by the Office in an earlier concluded examination or review of the patent, raised to or by the Office in a pending reexamination or supplemental examination of the patent, or decided in a final holding of invalidity (after all appeals) by a federal court in a decision on the merits involving the claim. MPEP § 2242.I.

2. Analysis

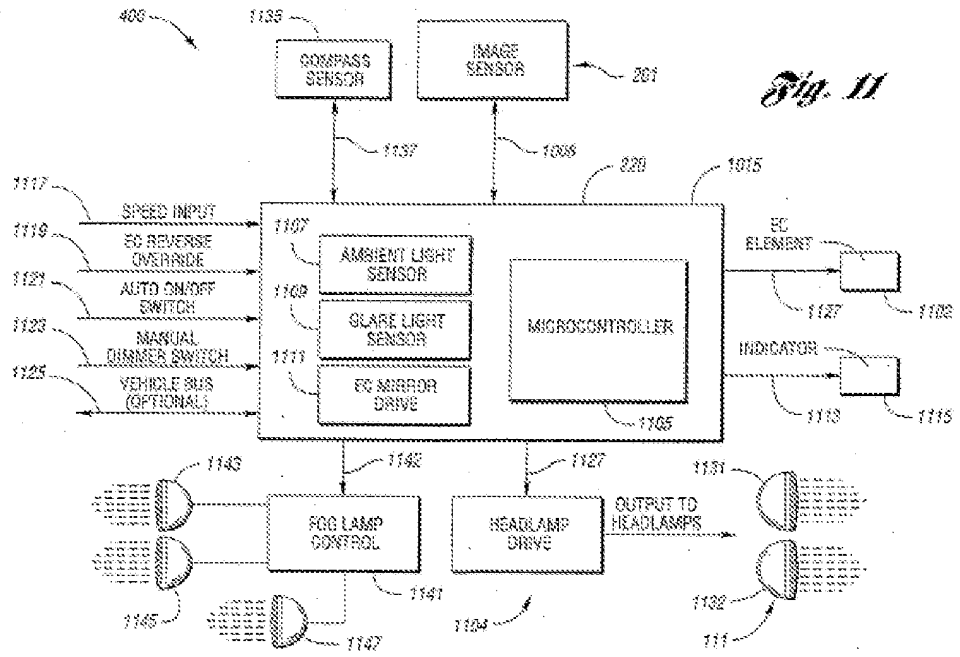
SNQ: **The Stam PCT and Harbers combination raises a SNQ of patentability regarding claim 6 of the '551 patent.**

It is agreed that the consideration of the combination of Stam PCT and Harbers raises a SNQ as to Claim 6 of the '551 patent.

Stam PCT (Ex. PA-A)

● Stam PCT (WO 01/70538 A2), filed on March 20, 2001, and was published on September 27, 2001, which was more than a year before the priority date of July 12, 2002 of the parent patent U.S. Patent No. 8,100,552 of the '551 patent. Accordingly, Stam PCT qualifies as a prior art reference under 35 U.S.C. § 102(b).

● Stam PCT is directed to an illuminating system (400) and method of automatically controlling exterior vehicle lights includes an image sensor (201) and a controller (1105) to generate control signals. The control signals are derived based on information obtained from the image sensor as well as other detected parameters pertaining to the detected light source(s), the vehicle having the inventive control system, and the ambient environment. The control circuit may simply turn certain exterior lights on or off, or change the brightness, aim, focus, etc. to produce various beam patterns that maximize the illuminated area in front of the vehicle without causing excessive glare in the eyes of other drivers. Ex. PA-A at Abstract, and Fig. 11.



● Stam PCT teaches the following elements and/or limitations of claim 6 including:

a structure for incorporating illuminating device elements (Stam PCT teaches a controller vehicle 100 for incorporating illuminating device elements comprising exterior lights, e.g., headlamps 1131, 1132, a control system comprising a controller 1015, an image sensor 201, etc.), Ex. PA-A at Abstract, and Figs. 1 and 11;

one or more light sources incorporated in the structure and in communication with a power source (Stam PCT teaches the use of LED headlamps 2600 having emitter 2603 and 2605 connected to an electrical connection for operation), Ex. PA-A at Figs. 26a and 26b, and pages 73-74;

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 (Stam PCT teaches the control system comprises an image array sensor including a plurality of pixels, an optical system configured to image the scene forward of the controlled vehicle onto the image array sensor, the optical system including a forward most surface, and a control circuit for processing the image of the scene obtained from the image array sensor and for controlling the exterior lights in response to objects detected in the processed scene.), Ex. PA-A at 2-3; and

a controller integrated with the structure, in communication with the light source controlling power circuitry, said controller arranged to [sic] processes the information communicated from the camera and automatically control the light provided to the illuminated area (Stam PCT teaches a system for automatically controlling exterior vehicle lights comprising an image sensor (201) and a controller (1105) to general control signals. The control signals are derived on information obtained from the image sensor as well as other detected parameters pertaining to

the detected light source(s), the vehicle having the inventive control system, and the ambient environment. (Ex. PA-A at Abstract). The control system comprises an image array sensor including a plurality of pixels, an optical system configured to image the scene forward of the controlled vehicle onto the image array sensor, the optical system including a forward most surface, and a control circuit for processing the image of the scene obtained from the image array sensor and for controlling the exterior lights in response to objects detected in the processed scene. Ex. PA-A at 5.

Harbers (U.S. Pat. No. 6,406,172)

● Harbers (U.S. Pat. No. 6,406,172), filed on Jun. 22, 2000, and was issued on Jun. 18, 2002, which was before the priority date of July 12, 2002 of the parent patent U.S. Patent No. 8,100,552 of the '551 patent. Accordingly, Harbers qualifies as a prior art reference under 35 U.S.C. § 102(e).

● Harbers is directed to a headlamp and dynamic lighting system for vehicles (1), *id.* Fig. 1. The system includes a light source (4, 5) comprising a plurality of opto-electronic elements (11, 12, 13, 14), preferably LEDs, *id.* Figs. 1-3. Wherein, the spatial distribution of the light beam (6, 6', …; 7, 7', …) generated by the light source is continuously adjustable based on the speed of the vehicle, the rotational position of the steering wheel of the vehicle, the weather conditions, and it can also be influenced by the driver. Preferably, the spectral characteristics of the light beam generated by the light source depend on the position in the light beam. The light beam comprises at least two beam segments (6, 6',..; 7, 7',..) having essentially different spectral characteristics, *id.* at Abstract. Ex. PA-B.

● Harbers teaches the controlled powering of the light source (Harbers teaches the use of a plurality of opto-electronic elements, e.g., LEDs 11, 12, 13, 14, with a relatively high luminous flux enables a vehicle headlamp to be manufactured having much more dynamic lighting possibilities than the known vehicle headlamp, *id.* Ex. PA-B at Figs. 1-2, and 2:6-9. Particularly, by controlled powering of the light source by switching on or off one or more opto-electronic elements at specific limiting values of the velocity of the vehicles, the weather condition, etc., the overall spatial distribution of the light is changed.), *id.* Ex. PA-B at Figs. 3-4, and 3:24-27, and 3:43-53. Accordingly, Harbers teaches the controlled powering of the light source for continuously adjustable spatial distribution of the light emitted by the vehicle headlamps in response to a specific set of defined inputs including the velocity of the vehicle, the weather condition, etc. However, Harbers doesn't disclose any sensor capable of detecting objects or targets in the illuminated area.

Accordingly, the combination of Stam PCT and Harbers teaches the elements and limitations of "a structure", "one or more light sources", "electronic circuitry apparatus", "one or more cameras placed on the structure for detecting coordinate-specific information about the illuminated area", and "a controller" recited in claim 6.

The combination of Stam PCT and Harbers references was never discussed by the Office in an earlier concluded examination or review of the patent, raised to or by the Office in a pending reexamination or supplemental examination of the patent, or decided in a final holding of invalidity (after all appeals) by a federal court in a decision on the merits involving the claims.

The teachings of Stam PCT and Harbers present a new, non-cumulative technological teaching that was not previously considered in the prosecution of the application which became

the ‘551 patent. Furthermore, there is a substantial likelihood that a reasonable examiner would consider the teachings of Stam PCT and Harbers important in deciding whether or not claim 6 is patentable. Accordingly, the combination of Stam PCT and Harbers references raises a SNQ as to claim 6 of the '551 patent.

Therefore, it is agreed that the consideration of the combination of Stam PCT and Harbers references raises a SNQ as to Claim 6 of the '551 patent.

V. CONCLUSION

1. A substantial new questions of patentability affecting claim 6 of the ‘551 patent is raised by the Request for *ex parte* reexamination. The Request for *ex parte* reexamination is GRANTED. Claim 6 of the ‘551 patent will be reexamined.

2. Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in ex parte reexamination proceedings are provided for in 37 CFR 1.550(c). See MPEP § 2265.

The Patent Owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity or other prior or concurrent proceeding, involving the ‘551 patent throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

3. Service of Papers

Any paper filed with the USPTO, i.e., any submission made, by either the Patent Owner or the Third Party Requester must be served on every other party in the reexamination proceeding, including any other third party requester that is part of the proceeding due to merger of the reexamination proceedings. As proof of service, the party submitting the paper to the Office must attach a Certificate of Service to the paper, which sets forth the name and address of the party served and the method of service. Papers filed without the required Certificate of Service may be denied consideration. See MPEP 2666.06, and 37 CFR 1.903.

4. Correspondence and Inquiry as to Office Actions

All correspondence related to this ex parte reexamination proceeding should be directed as follows:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i)(C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in

accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Signed:

/HENRY N TRAN/
Primary Examiner, Art Unit 3992

September 12, 2021

Conferees:

/ANGELA M LIE/
Primary Examiner, Art Unit 3992

/ANDREW J. FISCHER/
Supervisory Patent Reexamination Specialist, Art Unit 3992

Reexamination	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
	Certificate Date	Certificate Number

Requester Correspondence Address: ☑ **Patent Owner** ☐ **Third Party**

Brooks Kushman
1000 Town Center
22nd Floor
Southfield, MI 48075

LITIGATION REVIEW ☑	HT (examiner initials)	14 August 2021 (date)
Case Name		Director Initials
No		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Yechezkal Evan Spero
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	TRCH0102RX

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	3,316,442	A	1967-04-25	Konrad	
	2	6,406,172	B1	2002-06-18	Harbers et al.	
	3	6,587,573	B1	2003-07-01	Stam et al.	
	4	6,861,809	B2	2005-03-01	Stam	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.N.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Yechezkal Evan Spero
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	TRCH0102RX

	1	2001070538	WO	A2	2001-09-27	Stam et al.		☐
	2							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/HENRY N TRAN/	Date Considered	09/08/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.N.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Yechezkal Evan Spero
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	TRCH0102RX

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Sangeeta G. Shah/	Date (YYYY-MM-DD)	2021-07-30
Name/Print	Sangeeta G. Shah	Registration Number	38,614

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,815	07/30/2021	9955551B2	TRCH0102RX	6654

22045 7590 10/07/2021

Brooks Kushman
1000 Town Center
22nd Floor
Southfield, MI 48075

EXAMINER	
TRAN, HENRY N	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
10/07/2021	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Ex Parte Reexamination Interview Summary – Pilot Program for Waiver of Patent Owner's Statement	**Control No.** 90/014,815	**Patent Under Reexamination is Requested** 9955551	
	Examiner TRAN	**Art Unit** 3992	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --

All participants (USPTO official and patent owner):

(1) MANUEL SALDANA, CRU (3) _____

(2) SANGEETA SHAH, REG 38614 (4) _____

Date of Telephonic Interview: 06 October 2021.

A. The USPTO official requested waiver of the patent owner's statement pursuant to the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

☑ The patent owner **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

☐ The patent owner **did not agree** to waive its right to file a patent owner's statement under 35 U.S.C. 304 at this time.

☐ USPTO personnel were unable to reach the patent owner.**

B. The Patent Owner of record telephoned the Office and indicated they would like to participate in the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

☐ The Patent owner of record telephoned the Office and **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

The patent owner is not required to file a written statement of this telephone communication under 37 CFR 1.560(b) or otherwise. However, any disagreement as to this interview summary must be brought to the immediate attention of the USPTO, and no later than one month from the mailing date of this interview summary. Extensions of time are governed by 37 CFR 1.550(c).

*For more information regarding this pilot program, see *Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings, 75 Fed. Reg.* 47269 (August 5, 2010), available on the USPTO Web site at http://www.uspto.gov/patents/law/notices/2010.jsp.

**The patent owner may contact the USPTO personnel at (571) 272-7705 or at the telephone number provided below if the patent owner decides to waive the right to file a patent owner's statement under 35 U.S.C. 304.

/MANUEL SALDANA/ (571)272-7740
Signature and telephone number of the USPTO official, who contacted, was contacted by, or attempted to contact the patent owner.

cc: Requester (if third party requester)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,815	07/30/2021	9955551B2	TRCH0102RX	6654

22045 7590 03/16/2022

Brooks Kushman
1000 Town Center
22nd Floor
Southfield, MI 48075

EXAMINER	
TRAN, HENRY N	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
03/16/2022	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action in Ex Parte Reexamination	**Control No.** 90/014,815	**Patent Under Reexamination** 9955551	
	Examiner Henry Tran	**Art Unit** 3992	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a. ☑ Responsive to the communication(s) filed on 30 July 2021.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

b. ☐ This action is made FINAL.

c. ☐ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☑ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☑ Claims 6 and 24-87 are subject to reexamination.

1b. ☑ Claims 1-5 and 7-23 are not subject to reexamination.

2. ☐ Claims _____ have been canceled in the present reexamination proceeding.

3. ☑ Claims 24-87 are patentable and/or confirmed.

4. ☑ Claims 6 are rejected.

5. ☐ Claims _____ are objected to.

6. ☐ The drawings, filed on _____ are acceptable.

7. ☐ The proposed drawing correction, filed on _____ has been (7a) ☐ approved (7b) ☐ disapproved.

8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have

1 ☐ been received.

2 ☐ not been received.

3 ☐ been filed in Application No. _____.

4 ☐ been filed in reexamination Control No. _____.

5 ☐ been received by the International Bureau in PCT application No. _____.

* See the attached detailed Office action for a list of the certified copies not received.

9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.

10. ☐ Other: _____

cc: Requester (if third party requester)

EX PARTE REEXAMINATION
DETAILED NON-FINAL OFFICE ACTION

I. Summary of Proceedings

1. A Request pursuant to the provisions of 35 U.S.C. § 302-307 and 37 CFR § 1.510 *et seq*. for ex parte reexamination of Claim 6 of U.S. Pat. No. 9,955,551 B1 ("the '551 patent") issued on April 24, 2018 to Yechezkal Evan Spero ("Spero") entitled "DETECTOR CONTROLLED ILLUMINATING SYSTEM" was filed on July 30, 2021 ("the Request") by Patent Owner and inventor Spero.

2. A substantial new question (SNQ) of patentability affecting Claim 6 of the '551 patent has been found and the Order granting ex parte reexamination of Claim 6 of the '551 patent was mailed to the Patent Owner on September 20, 2021.

3. The time, TWO MONTHS from the mailing date of September 20, 2021 of the Order, for Patent Owner to file a statement under 37 CFR 1.530 (b) has expired. See MPEP § 2249. The ex parte reexamination proceeding is being conducted in accordance with 37 CFR 1.550. See MPEP § 2254.

4. Under 35 U.S.C. 302 and 37 CFR 1.510(e), the Patent Owner filed a proposed amendment with the Request, see Exhibits OTH-C and OTH-D. MPEP § 2221. The proposed amendment complies with the format and requirements of 37 CFR 1.530(d) through (j); and it has been entered in the reexamination file record. Claim 6 is original, claims 24-87 are new. Thus, claims 6 and 24-87 are pending or "live" claims. Of which, claims 6, 24, 32, 40, 48, 56, 64, 72, and 80 are nine (9) independent claims. Claims 6 and 24-87 are being reexamined/examined in this Office action.

5. Although the Office action will treat proposed amendment as though it has been entered, the proposed amendment will not be effective until the reexamination certificate is issued and published, 37 CFR 1.530(k). MPEP § 2234.

6. Claim 6 is rejected, and Claims 24-87 are patentable.

II. Prior Art References

1. The prior art patents and printed publications, or non-prior art patents under 37 CFR 1.510(b)(3), see form PTO/SB/08a, submitted with the Request and cited in the proposed rejections, see also pages i, 12, and 20 of the Request, are re-listed as follows.

> (1) WO 01/70538 A2 filed on March 20, 2001 (PCT/US01/08912) by Stam et al., and is published on September 27, 2001, (hereinafter "**Stam et al.**", or "**Stam PCT**"), (Ex. PA-A).
>
> (2) U.S. Pat. No. 6,406,172 B1 issued on Jun. 148, 2002 to Harbers et al. (hereinafter "**Harbers**" or "**the '172 patent**"), (Ex. PA-B).

2. None of the above-identified prior art patent and printed publication were considered during original prosecution of the '551 patent.

III. Claim Interpretation

1. The following is a quotation of 35 U.S.C. 112(f):

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

2. This application includes one or more claim limitations that do not use the word "means," but are nonetheless being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, because the claim limitation(s) uses a generic placeholder that is coupled with functional language without reciting sufficient structure to perform the recited function and the

generic placeholder is not preceded by a structural modifier. Such claim limitation(s) is/are: "electronic circuit apparatus" in claims 6, 24, 32, 40, 48, 56, 64, 72, and 80.

Because this/these claim limitation(s) is/are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, it/they is/are being interpreted to cover the corresponding structure described in a preferred embodiment as "logic control electronics unit 7", *id.* at Fig. 1, and col. 25:35-50, in the specification as performing the claimed function, and equivalents thereof.

If applicant does not intend to have this/these limitation(s) interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, applicant may: (1) amend the claim limitation(s) to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph (e.g., by reciting sufficient structure to perform the claimed function); or (2) present a sufficient showing that the claim limitation(s) recite(s) sufficient structure to perform the claimed function so as to avoid it/them being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph.

IV. Claim Rejections - 35 USC § 102

1. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

2. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claim 6** is rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by **Stam PCT** (PCT/US01/08912).

Regarding claim 6, Stam PCT teaches an illuminating system **400** having automatic controlling of the light provided to an illuminated area (automatically controlling of the exterior lights provided to regions of the field of view directly in front of a vehicle), *id.* Ex. PA-A at Abstract, and pages 2-3, comprising:

- a structure (a vehicle) **100** for incorporating illuminating device elements (headlamps) 111 or **1131**, **1132**, (a microcontroller or controller) **1015**, an image sensor **201**, etc. (Stam PCT teaches a controlled vehicle 100 for incorporating illuminating device elements comprising exterior lights, e.g., headlamps 111 or 1131, 1132, a controller 1015, an image sensor 201, etc.), *id.* Ex. PA-A at Abstract, and Figs. 1 and 11;

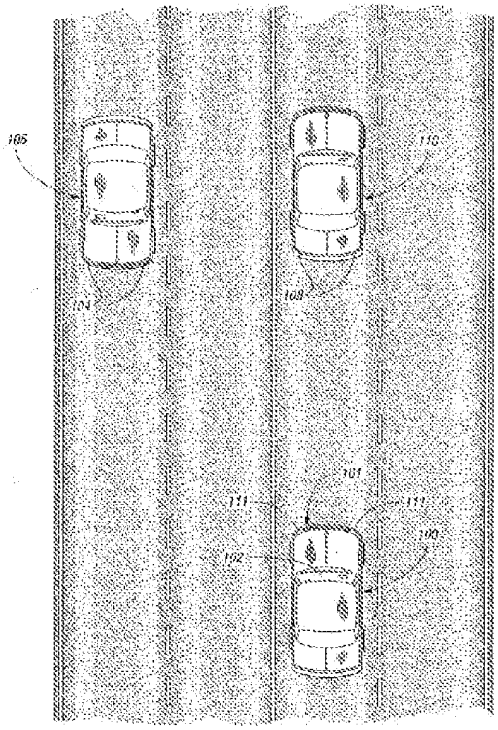


Fig. 1

Fig. 1 illustrates vehicles traveling on a common road.

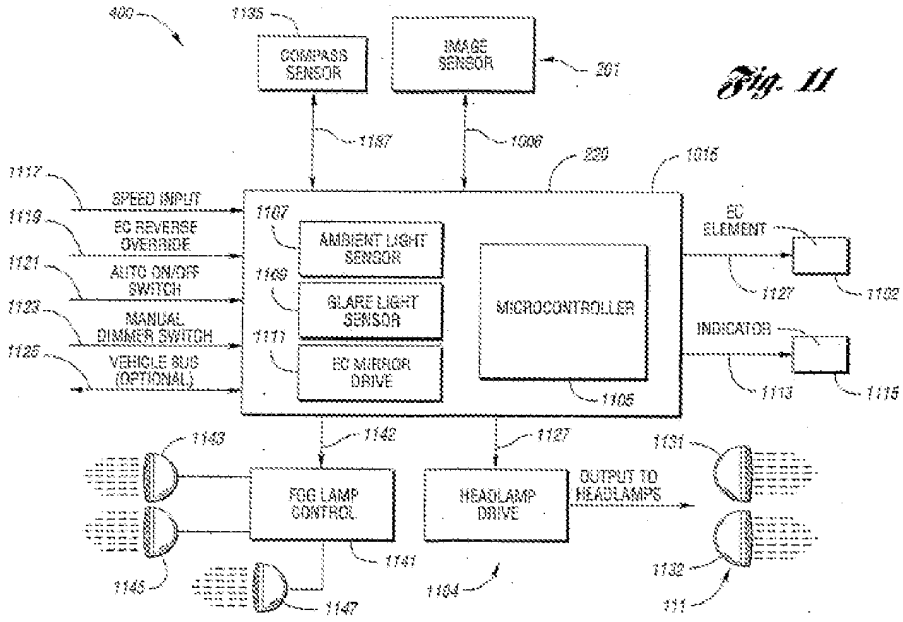


Fig. 11

Fig. 11 is a circuit schematic illustrating a circuit for an optical sensor system and an electrochromic mirror.

● one or more light sources (headlamps) **111**, or **1131**, **1132**, or (LED headlamps) **2600**, incorporated in the structure and in communication with a power source (electrical conductor strips) **2607**, **2613** (Stam PCT teaches LED headlamps 2600 having LEDs (semiconductor optical radiation emitters) 2603, 2605 connected to an electrical conductor strips 2607 and 2613 for operation), *id.* at Figs. 1, 11, or 26a and 26b, and pages 73-74;

● electronic circuitry apparatus (a headlamp controller, or a microcontroller) **1015** for the controlled powering of the light source and other illuminating device elements, *id.* at Figs. 34-36, and pages 70-72;

● one or more cameras (e.g., an image sensor) **201** coupled to a GPS receiver **3450**, and placed on the structure for detecting coordinate-specific information about the illuminated area, said camera in communication with power and control device elements (Stam PCT teaches a controlled vehicle 100 having an automatic headlamp dimmer includes an optical sensor system 102 comprising an image sensor 201 for detecting the headlamps 104 of an oncoming vehicle 105 and the tail lights 108 of a preceding vehicle 110; wherein, the headlamps 111 of the controlled vehicle 100 are controlled automatically to avoid shining the high beams, or bright lights, directly into the eyes of a driver of oncoming vehicle 105 or by reflection into the eyes of the driver of the preceding vehicle 110, *id.* at Figs. 1 and 11, and pages 10-11; and wherein, the microcontroller 1015 utilizes the location and direction of the vehicle (i.e., coordinate-specific information about the vehicle) identified by the GPS receiver 3450 for controlling the exterior lights on the vehicle.) *id.* at Fig. 1, 11 and 34, and page 72;

● a controller (a microcontroller) **1015** integrated with the structure (a vehicle) **100**, in communication with the light source (e.g., headlamps) **111** controlling power circuitry (a headlamp drive) **1104** (including a DC power supply), said controller arranged to processes the information communicated from the camera and automatically control the light provided to the illuminated area), *id.* at Fig. 1, 11, 12 and 34, and pages 27-28 and 72.

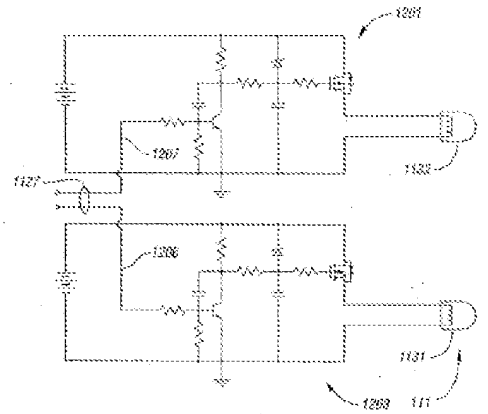


Fig. 12

Fig. 12 is a circuit schematic illustrating a headlamp drive (**1104**) for the circuit of Fig. 11

Claim 6 is therefore rejected.

V. Allowable Subject Matter

1. **Claims 24-87** are allowed.

2. The following is an examiner's statement of reasons for allowance:

The present invention is directed to a detector-controlled illumination system comprising a digital lighting fixture (DLF) 2 having multiple solid-state light sources (SLS) 3 affixed or mounted to a structure or a mechanical device 4, a power conditioning circuitry 5, optical elements 6, a control electronics unit 7, and one or more sensors 8. See Fig. 1, and col. 24:51-55. Particularly,

Regarding independent claims 24, 32, 40, 48, 56, 64, 72, and 80, each recites an illuminating device comprising a DLF (i.e., headlamps) 270 having a plurality of individually controllable LEDs 275, one or more sensors 280, and a controller 279 mounted to the structure of a motor vehicle 271 for automatically control the light provided to an illuminated area of the headlamp 270 of a motor vehicle 271, see Fig. 15. The claims each identifies, *inter alia*, the uniquely distinct features: memory storing instructions that, when executed by one or more processors of the controller, enable the controller to perform the following specific functional operations of:

- Claim 24: "determine first coordinates …", "select a cluster …", and "change emission of …", as recited on lines 21-29 of claim 24.
- Claim 32: "create a beam of …", and "follow, based at least …", as recited on lines 21-29 of claim 32.
- Claim 40: "determine a first cluster of …", "diminish glaring illumination of …", "determine a second, different cluster of the LEDs …", and "diminish glaring illumination of the second …", as recited on lines 21-33 of claim 40.
- Claim 48: "illuminate a portion of …, the first cluster selected based at least in part on known aimings of light associated with the first cluster determined to correspond to the first area, and the first light determined based at least in part on classifying the object …", as recited on lines 20-30 of claim 48.
- Claim 56: "determine, based on data …", "select a first cluster …", and "reduce intensity of …", as recited on lines 21-29 of claim 56.
- Claim 64: "select a first cluster …", "control a first change to …", "select a second, different cluster of the LEDs having…" and "control a second, …", as recited on lines 21-33 of claim 64.

● Claim 72: "determine a target based on …", "determine a fist target location …", "select a cluster of the LEDs having …", "vary illumination …", and "maintain a variance of illumination …", as recited on lines 20-31 of claim 72.

● Claim 80: "identify, based on data received from …", and "change, responsive to the positions associated with the target, first light …", as recited on lines 21-26 of claim 80.

Whereas, the cited prior art references:

▪ **Stam PCT** (Ex. PA-A) teaches a system and method of automatically controlling exterior vehicle lights includes headlamps (111), an image sensor (201) and a controller (1105) to generate control signals provided a control circuit, e.g., a headlamp drive, (1104) for turning certain exterior lights on or off, or change the brightness, aim, focus, etc. to produce various beam patterns that maximize the illuminated area in front of the vehicle without causing excessive glare in the eyes of the other drivers. *Id.* Abstract, and Fig. 11. Particularly, Stam PCT teaches a controlled vehicle 100 having an automatic headlamp dimmer includes an optical sensor system 102 comprising an image sensor 201 for detecting the headlamps 104 of an oncoming vehicle 105 and the tail lights 108 of a preceding vehicle 110; wherein, the headlamps 111 of the controlled vehicle 100 are controlled automatically to avoid shining the high beams, or bright lights, directly into the eyes of a driver of oncoming vehicle 105 or by reflection into the eyes of the driver of the preceding vehicle 110, *id.* at Figs. 1 and 11, and pages 10-11; and wherein, the microcontroller 1015 utilizes the location and direction of the vehicle identified by the GPS receiver 3450 for controlling the exterior lights on the vehicle.) *id.* at Fig. 1, 11 and 34, and page 72.

▪ **Harbers** (Ex. PA-B) teaches a headlamp and dynamic lighting system for a vehicle (1) comprising a headlamp (2, 3) provided with a light source (4, 5) having a plurality of opto-

electronic elements (11, 12, 13, 14), preferably LEDs, which emits light beams 6, 6'…; 7, 7', … in a longitudinal direction 9. Wherein, the spatial distribution of the light beams generated by the opto-electronic elements of the light source can be continuously adjusted or switched on and off, in dependence upon the velocity of the vehicle, the rotational position of the steering wheel, or weather conditions, etc. for providing an improved visibility of the surroundings of the vehicle. See Abstract, Figs.1A, 1B, and 2, col. 5:31-43, col. 6:58-col. 7:22, col. 7:50-51, and col. 8:1-13.

However, the Stam PCT and Harbers, either singularly or in combination, fails to teach or suggest the controller configured to perform the above-identified functional operations of the claimed inventions.

Regarding dependent claims 24-31, 33-39, 41-47, 49-55, 57-63, 65-71, 73-79, and 81-87, each directly or indirectly depends on the base claims 24, 32, 40, 48, 56, 64, 72, and 80, respectively, and is allowed et least due to its dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

VI. Information Disclosure Statement

1. The Patent Owner's information disclosure statement (IDS), see form PTO/SB/08a, submitted with the Request filed on July 30, 2021 in accordance with 37 CFR 1.98, has been considered. The information comprising patents and publications cited in form PTO/SB/08a has been considered to the extent suggested in the MPEP. See MPEP § 2014. Note that MPEP §§ 2256 and 2280 indicate that degree of consideration to be given to such information will be normally

limited by the degree to which the party filing the information citation has explained the content and relevance of the information.

VII. CONCLUSION

1. Claim 6 is rejected, and Claims 24-87 are patentable.

VIII. CORRESPONDENCE

1. Notice Re Patent Owner's Correspondence Address

Effective May 16, 2007, 37 CFR 1.33(c) has been revised to provide that: The Patent owner's correspondence address for all communications in an ex parte reexamination is designated as the correspondence address of the patent.

Revisions and Technical Corrections Affecting Requirements for Ex Parte,

72 FR 18892 (April 16, 2007) (Final Rule).

The correspondence address for any pending reexamination proceeding not having the same correspondence address as that of the patent is, by way of his revision to 37 CFR 1.33(c), automatically changed to that of the patent file as of the effective date.

This change is effective for any reexamination proceeding which is pending before the Office as of May 16, 2007, including the present reexamination proceeding, and to any reexamination proceeding which is filed after that date.

Parties are to take this change into account when filing papers, and direct communications accordingly.

In the event the patent owner's correspondence address listed in the papers (record) for the present proceeding is different from the correspondence address of the patent, it is strongly encouraged that the patent owner affirmatively file a Notification of Change of Correspondence

Address in the reexamination proceeding and/or the patent (depending on which address patent owner desires), to conform the address of the proceeding with that of the patent and to clarify the record as to which address should be used for correspondence.

Telephone Numbers for reexamination inquiries:

Reexamination (571) 272-7703

Central Reexam Unit (CRU) (571) 272-7705

Reexamination Facsimile Transmission No. (571) 273-9900

2. In order to ensure full consideration of any amendments, affidavits or declarations, or other documents as evidence of patentability, such documents must be submitted in response to this Office action. Submissions after the next Office action, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, after final rejection and 37 CFR 41.33 after appeal, which will be strictly enforced.

3. The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the '551 patent throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

4. Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)).

Extension of time in reexamination proceedings are provided for in 37 CFR 1.550(c).

5. All correspondence related to this ex parte reexamination proceeding should be directed as follows:

By EFS-Web: Registered Users may submit correspondence via EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered.

By Mail to: Mail Stop *ex parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

For electronic transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft-scanned' (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submission after the "soft scanning" process is complete.

Any inquiry concerning this communication should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/HENRY N TRAN/
Primary Examiner, Art Unit 3992

Conferees:

/ANGELA M LIE/
Primary Examiner, Art Unit 3992

/ANDREW J. FISCHER/
Supervisory Patent Reexamination Specialist, Art Unit 3992

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
	Examiner	Art Unit
	Henry Tran	3992

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Reviewed the 9955551 patent file's Prosecution History	02/17/2022	HT
Searched the Patent 9955551 Reexam Prosecution History in PTAB	03/02/2022	HT
Reviewed/conferenced with PE. A. Lie and SPE. A. Fischer	03/03/2022 & 03/10/2022	HT

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/HENRY N TRAN/ Primary Examiner, Art Unit 3992	

Reexamination	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
	Certificate Date	Certificate Number

Requester Correspondence Address: ☑ **Patent Owner** ☐ **Third Party**

Brooks Kushman
1000 Town Center
22nd Floor
Southfield, MI 48075

LITIGATION REVIEW ☑	HT (examiner initials)	14 August 2021 (date)
Case Name		Director Initials
None		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**
None	

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Yechezkal Evan Spero
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	TRCH0102RX

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	3,316,442	A	1967-04-25	Konrad	
	2	6,406,172	B1	2002-06-18	Harbers et al.	
	3	6,587,573	B1	2003-07-01	Stam et al.	
	4	6,861,809	B2	2005-03-01	Stam	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

EFS Web 2.1.18

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.N.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Yechezkal Evan Spero
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	TRCH0102RX

	1	2001070538	WO	A2	2001-09-27	Stam et al.		☐
	2							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/HENRY N TRAN/	Date Considered	09/08/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.N.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Yechezkal Evan Spero
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	TRCH0102RX

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Sangeeta G. Shah/	Date (YYYY-MM-DD)	2021-07-30
Name/Print	Sangeeta G. Shah	Registration Number	38,614

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: M865 or FAI.REQ.INTV

PTOL-413A (07-16)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Applicant Initiated Interview Request Form

Application No.: 90014815 First Named Applicant: Yechezkal Evan SPERO
Examiner: Henry N. Tran Art Unit: 3992 Status of Application: Pending Reexam

Tentative Participants:
(1) Sangeeta Shah (2) Bernard Tomsa

(3) Examiner Tran (4) _____

Proposed Date of Interview: Monday, April 18, 2022 **Proposed Time:** 11:00 (◉AM ◉PM)

Type of Interview Requested:
(1) ☐ Telephonic (2) ☐ Personal (3) ☑ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☑ NO
If yes, provide brief description: _____

Issues To Be Discussed See Continuation Sheet attached

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) Rejection 35 USC 112(f)	6, 24, 32, 40, 48, 56, 72	N/A	☐	☐	☐
(2)			☐	☐	☐
(3)			☐	☐	☐
(4)			☐	☐	☐

☐ Continuation Sheet Attached ☐ Proposed Amendment or Arguments Attached
Brief Description of Arguments to be Presented: Interpretation of the claim limitation "electronic circuitry apparatus".

An interview was conducted on the above-identified application on _____

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/Sangeeta G. Shah/
Applicant/Applicant's Representative Signature

Examiner/SPE Signature

Sangeeta G. shah
Typed/Printed Name of Applicant or Representative

(248) 358-4400
Applicant's/Applicant's Representative's Telephone Number

38,614
Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 24 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

(Continuation Sheet)

Issues to Be Discussed:

	Issues (Rej., Obj., etc)	Claims/Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
1	35 USC 112(f) Claim Interpretation	6,24,32,40,48,56, 64,72 and 80	N/A			

Brief Description of Arguments to be Presented:

Thank you for the courtesy of an interview. Patent Owner would like to discuss the interpretation of the claim limitation "electronic circuitry apparatus" in claims 6, 24, 32, 40, 48, 56, 64, 72 and 80 under 35 USC 112(f) or pre-AIA 35 USC 112(6). As the relevant claims do not include the terms "means" or "step," one or more aspects of the phrase "electronic circuitry apparatus" is being considered to be a generic placeholder under the 3-part test set forth in MPEP 2181(I).

Patent Owner points out that the term "apparatus" is preceded by a structural modifier-- "electronic circuitry." Patent Owner further notes that the Federal Circuit has ruled that "the term 'circuit' coupled with a description in the claims of the circuit's operation typically conveys necessary structure. *See, e.g., Linear Tech Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1230-21 (Fed. Cir. 2004)*; Apex Inc. v. Raritan Comp., Inc.*, 325 F.3d 1364, 1374 (Fed. Cir. 2003*)*. Here, the claim term "electronic circuitry apparatus" is followed by claim language "for the controlled powering of the light source and other illuminating device elements"—which provides a description of the circuit's operation and conveys necessary structure.

Accordingly, Patent Owner would discuss at least prong (C) of the test set forth in MPEP 2181(I) and takes the position that sufficient structure ("electronic circuitry") is provided in the noted claim limitation for performing the claimed function. In the absence of fulfilment of prong (C), Applicant does not believe that 35 USC 112(f)/pre-AIA 35 USC 112(6) interpretation applies to the phrase "electronic circuitry apparatus."

Electronic Acknowledgement Receipt

EFS ID:	45479864
Application Number:	90014815
International Application Number:	
Confirmation Number:	6654
Title of Invention:	Detector Controlled Illuminating System
First Named Inventor/Applicant Name:	9955551B2
Customer Number:	22045
Filer:	Sangeeta G Shah/Fiona Archer
Filer Authorized By:	Sangeeta G Shah
Attorney Docket Number:	TRCH0102RX
Receipt Date:	14-APR-2022
Filing Date:	30-JUL-2021
Time Stamp:	18:05:05
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Letter Requesting Interview with Examiner	TRCH0102RX_Interview_Request.PDF	349910 ffddae50cab0fc098058bd13c51f34d6fd6bdc8f	no	2

Warnings:

Information:	
Total Files Size (in bytes):	349910

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: ECOMM.AUTH/ECOMM.WTDW
Doc Description: Internet Communications Authorization/Internet Communications Authorization Withdrawal

PTO/SB/439 (11-15)

AUTHORIZATION FOR INTERNET COMMUNICATIONS IN A PATENT APPLICATION OR REQUEST TO WITHDRAW AUTHORIZATION FOR INTERNET COMMUNICATIONS

Application No.	90/014,815
Filing Date	July 30, 2021
First Named Inventor	Yechezkal Evan Spero
Art Unit	3992
Examiner Name	Tran, Henry N.
Practitioner Docket No.	TRCH0102RX

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I. To authorize permission for Internet Communications.

☒ Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned and practitioners in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via video conferencing, instant messaging, or electronic mail. I understand that a copy of these communications will be made of record in the application file. (MPEP 502.03)

II. To withdraw authorization for Internet Communications.

☐ The authorization given on _____, to the USPTO to communicate with the undersigned and any practitioner in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via internet communications such as video conferencing, instant messaging, or electronic mail is hereby withdrawn. I understand that the withdrawal is effective when approved rather than when received.

I am the

☐ applicant.

☒ attorney or agent of record. Registration number 38,614.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Sangeeta G. Shah/ — Signature

April 22, 2022 — Date

Sangeeta G. Shah — Typed or printed name

248-358-4400 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Juristic entities must be represented by a patent practitioner (see 37 CFR 1.31, which is applicable to any paper filed on or after September 16, 2012, that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below*.

☒ * Total of 1 forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	45536041
Application Number:	90014815
International Application Number:	
Confirmation Number:	6654
Title of Invention:	Detector Controlled Illuminating System
First Named Inventor/Applicant Name:	9955551B2
Customer Number:	22045
Filer:	Sangeeta G Shah/Fiona Archer
Filer Authorized By:	Sangeeta G Shah
Attorney Docket Number:	TRCH0102RX
Receipt Date:	22-APR-2022
Filing Date:	30-JUL-2021
Time Stamp:	11:36:20
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	TRCH0102RX_Authorization_Internet_Communications.PDF	171234 c792f98ded889593a31ece806d054577c0ffe2a6	no	2

Warnings:

Information:	
Total Files Size (in bytes):	171234

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexam application of:

Yechezkal Evan SPERO

Serial No.: 90/014,815

Filed: July 30, 2021

For: Detector Controlled Illuminating System

Attorney Docket No.: TRCH0102RX

Group Art Unit: 3992

Examiner: Tran, Henry N.

STATEMENT UNDER 37 C.F.R. §1.565(d)

Mail Stop Reexam
Commissioner for Patents
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

In accordance with 37 C.F.R. §1.565(d), the patent owner hereby informs the Office of a concurrent proceeding in which U.S. Patent No 9,955,551 is involved, namely an *ex parte* reexamination filed on July 30, 2021 and a broadening Reissue application, Serial No. 16/858,342 filed on April 24, 2020.

Patent Owner hereby confirms that it does not intend and will not broaden claim 6 of the 9,955,551 patent as part of the broadening reissue application—eliminating any potential overlap between the reexamination proceeding and the reissue application. To ensure the reexamination proceeding can continue with special dispatch, Patentee hereby requests a stay of the reissue application pending conclusion of the reexamination proceeding.

Should the Central Reexamination Unit have any questions or desire further clarification, please contact the undersigned.

Respectfully submitted,

Yechezkal Evan Spero

By: /Sangeeta G. Shah/
Sangeeta G. Shah
Reg. No. 38,614
Attorney/Agent for Applicant

Date: May 6, 2022

BROOKS KUSHMAN P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075-1238
Phone: 248-358-4400
Fax: 248-358-3351

Electronic Acknowledgement Receipt

EFS ID:	45656051
Application Number:	90014815
International Application Number:	
Confirmation Number:	6654
Title of Invention:	Detector Controlled Illuminating System
First Named Inventor/Applicant Name:	9955551B2
Customer Number:	22045
Filer:	Sangeeta G Shah/Fiona Archer
Filer Authorized By:	Sangeeta G Shah
Attorney Docket Number:	TRCH0102RX
Receipt Date:	06-MAY-2022
Filing Date:	30-JUL-2021
Time Stamp:	18:38:57
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Notice of concurrent proceeding(s)	TRCH0102RX_Statement_Concurrent_Proceedings.pdf	97353 6d4ceaf88cc78a52650fe6681de12bdef2060e2a	no	2

Warnings:

Information:	
Total Files Size (in bytes):	97353

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CLAIMS:

6. (Canceled)

Electronic Acknowledgement Receipt

EFS ID:	45723844
Application Number:	90014815
International Application Number:	
Confirmation Number:	6654
Title of Invention:	Detector Controlled Illuminating System
First Named Inventor/Applicant Name:	9955551B2
Customer Number:	22045
Filer:	Sangeeta G Shah/Fiona Archer
Filer Authorized By:	Sangeeta G Shah
Attorney Docket Number:	TRCH0102RX
Receipt Date:	16-MAY-2022
Filing Date:	30-JUL-2021
Time Stamp:	16:13:14
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response after non-final action-owner timely	Spero_Response_to_Office_Action_dated_3-16-22.PDF	178542 b8964704f6c16869bd7fcef5e3ef08c3ab131539	no	4

Warnings:

Information:					
2	Amendment Copy Claims/Response to Suggested Claims	OTH_A_Amended_Claims.PDF	27603 1f6e70a5de45ee33f3c9ee5d39d73123ac9c222b	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	206145	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Yechezkal Evan SPERO Group Art Unit: 3992

Application/Control No.: 90/014,815 Examiner: Tran, Henry N.

Patent No.: 9,955,551

Filed: July 30, 2021

For: DETECTOR CONTROLLED ILLUMINATING SYSTEM

Attorney Docket No.: TRCH0102RX

PATENT OWNER RESPONSE TO REEXAMINATION UNDER 37 C.F.R. 1.550 WITH AMENDMENT

Mail Stop *Ex Parte* Reexamination
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Patentee submits the following response to the March 16, 2022 Office Action. In addition, Patentee submits Exhibit OTH-A, claim amendments under 37 CFR 1.550(d), which cancels claim 6.

REMARKS

In response to the Examiner's March 16, 2022 Office Action, Patentee asserts that the claim limitation "electronic circuitry apparatus" in claims 6, 24, 32, 40, 48, 56, 64, 72 and 80 does not invoke 35 U.S.C. § 112(f) or pre-AIA 35 U.S.C. § 112(6) as the claim limitation term includes a structural modifier – "electronic circuitry." Patent Owners notes that the Federal Circuit has ruled that "the term 'circuit' coupled with a description in the claims of the circuit's operation typically conveys necessary structure." *See, e.g., Linear Tech Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1230-21 (Fed. Cir. 2004)*; Apex Inc. v. Raritan Comp., Inc.*, 325 F.3d 1364, 1374 (Fed. Cir. 2003*).*

More specifically, as stated in MPEP 2181(I)(A), "apparatus for" is a non-structural generic placeholder that may invoke 112(6), such that prong (A) of the test is satisfied. Similarly, the claims include "for . . ." that links the functional language "controlled powering of the light source . . .", such that prong (B) of the test is satisfied. However, the generic placeholder "apparatus" is modified by "sufficient structure . . . for performing the claimed function", i.e. "electronic circuitry", such that prong (C) is not satisfied and thus 112(6) does not apply. MPEP 2181(I)(A) acknowledges that a "circuit" or "circuitry" are structural terms that have been found not to invoke 112(6):

> The following are examples of structural terms that have been found not to invoke 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, paragraph 6: "circuit," "detent mechanism," "digital detector," "reciprocating member," "connector assembly," "perforation," "sealingly connected joints," and "eyeglass hanger member." *See Mass. Inst. of Tech.*, 462 F.3d at 1355-1356, 80 USPQ2d at 1332 (the court found the recitation of "aesthetic correction circuitry" sufficient to avoid pre-AIA 35 U.S.C. 112, paragraph 6, treatment because the term circuit, combined with a description of the function of the circuit, connoted sufficient structure to one of ordinary skill in the art.); *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1321, 72 USPQ2d 1065, 1071 (Fed. Cir. 2004); Apex, 325 F.3d at 1373, 66 USPQ2d at 1452; *Greenberg*, 91 F.3d at 1583-84, 39 USPQ2d at 1786; *Personalized Media*, 161 F.3d at 704-05, 39 USPQ2d at 1786; *CCS Fitness*, 288 F.3d at 1369-70, 62 USPQ2d at 1664-65; *Cole v. Kimberly-Clark Corp.*, 102 F.3d 524, 531 (Fed. Cir. 1996); *Watts*, 232 F.3d at 881, 56 USPQ2d at 1839; *Al-Site*

Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1318-19, 50 USPQ2d 1161, 1166-67 (Fed. Cir. 1999).

MPEP 2181(I)(A)

The specification is replete with examples of circuits and electronic circuitry (e.g., "The electric power is received in the correct waveform, voltage and current from the power source 1, or is conditioned within the DLF 2, by power conditioning elements and circuitry 5" [col. 19, ll. 66-67]) such that "persons of ordinary skill in the art reading the specification understand the term to have a sufficiently definite meaning as the name for the structure that performs the function, even when the term covers a broad class of structures or identifies the structures by their function" as required by MPEP 2181 such that application of 112(6) is improper.

Finally, while Patentee is cancelling claim 6, as a point of clarification, Patentee notes that in the non-final rejection of claim 6, the Examiner on page 7 equated both "electronic circuitry apparatus" and "controller" of claim 6 to the same element of Stam, namely, the microcontroller 1015. The "electronic circuitry apparatus" is recited in claim 6 as "electronic circuitry apparatus for the controlled powering of the light source and other illuminating device elements." The "controller" is recited in claim 6 as "a controller integrated within the structure in communication with the light source controlling power circuitry…" Thus, based on the claim language, the "electronic circuitry apparatus for the controlled powering of the light source" is the "light source controlling power circuitry" with which the "controller" communicates. Applicant notes that while the electronic circuitry apparatus being part of the controller is a possible construction under 112(6) of "electronic circuitry apparatus," there are also numerous examples in the specification where structure that would correspond to the claimed function – circuitry or the like "for the controlled powering of the light source and other illuminating device elements" – is not actually part of the controller and would constitute something external to the controller with which the controller communicates (e.g. "power circuits available in the literature for driving the LEDs are used as published in technical notes by manufactures such as Agilent®" [Col. 15, ll. 34-36]).

CONCLUSION

For at least the foregoing reasons, Patentee believes that 112(6) construction is improper. Applicant agrees to cancel claim 6 and proceed with allowance of claims 24-87 and such action

by the Examiner is respectfully requested. If a telephone conference would resolve any additional questions, such a call is invited at the Examiner's convenience.

Please charge any fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978.

Respectfully submitted,

Yechezkal Evan SPERO

By: /Sangeeta G. Shah/
Brooks Kushman P.C.
Reg. No. 38,614
Attorneys for Patentee

Date: May 16, 2022

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1000 Town Center, 22nd Floor
Southfield, MI 48075-1238
Phone: 248-358-4400
Fax: 248-358-3351

Electronic Acknowledgement Receipt

EFS ID:	46071641
Application Number:	90014815
International Application Number:	
Confirmation Number:	6654
Title of Invention:	Detector Controlled Illuminating System
First Named Inventor/Applicant Name:	9955551B2
Customer Number:	22045
Filer:	Sangeeta G Shah/Fiona Archer
Filer Authorized By:	Sangeeta G Shah
Attorney Docket Number:	TRCH0102RX
Receipt Date:	29-JUN-2022
Filing Date:	30-JUL-2021
Time Stamp:	09:11:57
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Notice of concurrent proceeding(s)	TRCH0102RX_Report_on_filing_action_patent_1.pdf	164737 7189c02f157ad4c364a812bcdb22683485dbde99	no	1

Warnings:

Information:					
2	Notice of concurrent proceeding(s)	TRCH0102RX_Report_on_filing_action_patent_2.pdf	160595 b961ef68016c9da08e7a9c4f0962ba914e060d5a	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	325332	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the District of Delaware on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
1:22-cv-00752	06/07/2022	for the District of Delaware

PLAINTIFF	DEFENDANT
Torchlight Technologies LLC	General Motors LLC, General Motors Holdings LLC, and General Motors Company

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	9,955,551	4/24/2018	Yechezkal Evan Spero
2	10,894,503	1/19/2021	Yechezkal Evan Spero
3	11,208,029	12/28/2021	Yechezkal Evan Spero
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

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1:22-cv-00751	6/7/2022	for the District of Delaware

PLAINTIFF	DEFENDANT
Torchlight Technologies LLC	Daimler AG, Mercedes-Benz USA, LLC, Volkswagen Group of America, Inc., Audi AG, Audi of America, LLC, Porsche AG, and Porsche Cars North America, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	9,955,551	4/24/2018	Yechezkal Evan Spero
2	10,894,503	1/19/2021	Yechezkal Evan Spero
3	11,208,029	12/28/2021	Yechezkal Evan Spero
4			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,815	07/30/2021	9955551B2	TRCH0102RX	6654

22045 7590 07/29/2022

Brooks Kushman
1000 Town Center
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Southfield, MI 48075

EXAMINER	
TRAN, HENRY N	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
07/29/2022	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of Intent to Issue Ex Parte Reexamination Certificate	**Control No.** 90/014,815	**Patent Under Reexamination** 9955551	
	Examiner Henry Tran	**Art Unit** 3992	**AIA Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☑ Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. *Cf.* 37 CFR 1.313(a). A Certificate will be issued in view of
   (a) ☑ Patent owner's communication(s) filed: 16 May 2022.
   (b) ☐ Patent owner's failure to file an appropriate timely response to the Office action mailed: _____.
   (c) ☐ Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
   (d) ☐ The decision on appeal by the ☐ Board of Patent Appeals and Interferences ☐ Court dated _____
   (e) ☐ Other: _____.
2. The Reexamination Certificate will indicate the following:
   (a) Change in the Specification: ☐ Yes ☑ No
   (b) Change in the Drawing(s): ☐ Yes ☑ No
   (c) Status of the Claim(s):
      (1) Patent claim(s) confirmed: None.
      (2) Patent claim(s) amended (including dependent on amended claim(s)): None
      (3) Patent claim(s) canceled: 6.
      (4) Newly presented claim(s) patentable: 24-87.
      (5) Newly presented canceled claims: _____.
      (6) Patent claim(s) ☐ previously ☐ currently disclaimed: _____
      (7) Patent claim(s) not subject to reexamination: 1-5 and 7-23.
3. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
4. ☑ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."
5. ☐ Note attached NOTICE OF REFERENCES CITED (PTO-892).
6. ☐ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).
7. ☐ The drawing correction request filed on _____ is: ☐approved ☐disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐None of the certified copies have
   ☐been received.
   ☐not been received.
   ☐been filed in Application No. _____.
   ☐been filed in reexamination Control No. _____.
   ☐been received by the International Bureau in PCT Application No. _____.

   * Certified copies not received: _____.
9. ☐ Note attached Examiner's Amendment.
10. ☐ Note attached Interview Summary (PTO-474).
11. ☐ Other: _____.

All correspondence relating to this reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

/HENRY N TRAN/ Primary Examiner, Art Unit 3992	/ANGELA M LIE/ Primary Examiner, Art Unit 3992

cc: Requester (if third party requester)

EX PARTE REEXAMINATION

NOTICE OF INTENT TO ISSUE EX PARTE REEXAMINATION CERTIFICATE

(NIRC)

Summary

1. U.S. Patent No. 9,955,551 B2 (the '551 patent) includes patent claims 1-23. The '551 patent claim 6 and new claims 24-87 are subject to reexamination. Claims 1-5 and 7-23 are not subject to reexamination.

2. Claim 6 has been canceled by the Amendment filed on May 16, 2022

3. Claims 24-87 are allowed and/or confirmed.

Allowable Subject Matter

4. Claims 24-87 are allowed and/or confirmed.

STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

5. The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

The present invention is directed to a detector-controlled illumination system comprising a digital lighting fixture (DLF) **2** having multiple solid-state light sources (SLS) **3** affixed or mounted to a structure or a mechanical device **4**, a power conditioning circuitry **5**, optical elements **6**, a control electronics unit **7**, and one or more sensors **8**. See Fig. 1, and col. 24:51-55.

Regarding independent claims 24, 32, 40, 48, 56, 64, 72, and 80, each recites an illuminating device having automatic control of light provided to an illuminated area of a motor vehicle **271** comprising at least one headlamp **270** having a plurality of individually controllable

LEDs **275**, one or more sensors **280**, and a controller **279**, see Fig. 15. Particularly, the claims each identifies, *inter alia*, the uniquely distinct features: memory storing instructions that, when executed by one or more processors of the controller, enable the controller to perform the following specific functional operations of:

- Claim 24: "determine first coordinates …", "select a cluster …", and "change emission of …", as recited on lines 21-29 of claim 24.
- Claim 32: "create a beam of …", and "follow, based at least …", as recited on lines 21-29 of claim 32.
- Claim 40: "determine a first cluster of …", "diminish glaring illumination of …", "determine a second, different cluster of the LEDs …", and "diminish glaring illumination of the second …", as recited on lines 21-33 of claim 40.
- Claim 48: "illuminate a portion of …, the first cluster selected based at least in part on known aimings of light associated with the first cluster determined to correspond to the first area, and the first light determined based at least in part on classifying the object …", as recited on lines 20-30 of claim 48.
- Claim 56: "determine, based on data …", "select a first cluster …", and "reduce intensity of …", as recited on lines 21-29 of claim 56.
- Claim 64: "select a first cluster …", "control a first change to …", "select a second, different cluster of the LEDs having…" and "control a second, …", as recited on lines 21-33 of claim 64.
- Claim 72: "determine a target based on …", "determine a fist target location …", "select a cluster of the LEDs having …", "vary illumination …", and "maintain a variance of illumination …", as recited on lines 20-31 of claim 72.

● Claim 80: "identify, based on data received from …", and "change, responsive to the positions associated with the target, first light …", as recited on lines 21-26 of claim 80.

Whereas, the cited prior art references:

▪ **Stam PCT** (Ex. PA-A) teaches a system and method of automatically controlling exterior vehicle lights includes headlamps (111), an image sensor (201) and a controller (1105) to generate control signals provided a control circuit, e.g., a headlamp drive, (1104) for turning certain exterior lights on or off, or change the brightness, aim, focus, etc. to produce various beam patterns that maximize the illuminated area in front of the vehicle without causing excessive glare in the eyes of the other drivers. *Id.* Abstract, and Fig. 11. Particularly, Stam PCT teaches a controlled vehicle 100 having an automatic headlamp dimmer includes an optical sensor system 102 comprising an image sensor 201 for detecting the headlamps 104 of an oncoming vehicle 105 and the tail lights 108 of a preceding vehicle 110; wherein, the headlamps 111 of the controlled vehicle 100 are controlled automatically to avoid shining the high beams, or bright lights, directly into the eyes of a driver of oncoming vehicle 105 or by reflection into the eyes of the driver of the preceding vehicle 110, *id.* at Figs. 1 and 11, and pages 10-11; and wherein, the microcontroller 1015 utilizes the location and direction of the vehicle identified by the GPS receiver 3450 for controlling the exterior lights on the vehicle.) *id.* at Fig. 1, 11 and 34, and page 72.

▪ **Harbers** (Ex. PA-B) teaches a headlamp and dynamic lighting system for a vehicle (1) comprising a headlamp (2, 3) provided with a light source (4, 5) having a plurality of opto-electronic elements (11, 12, 13, 14), preferably LEDs, which emits light beams 6, 6'…; 7, 7', … in a longitudinal direction 9. Wherein, the spatial distribution of the light beams generated by the opto-electronic elements of the light source can be continuously adjusted or switched on and

off, in dependence upon the velocity of the vehicle, the rotational position of the steering wheel, or weather conditions, etc. for providing an improved visibility of the surroundings of the vehicle. See Abstract, Figs.1A, 1B, and 2, col. 5:31-43, col. 6:58-col. 7:22, col. 7:50-51, and col. 8:1-13.

However, the Stam PCT and Harbers, either singularly or in combination, fails to teach or suggest the controller configured to perform the above-identified functional operations of the claimed inventions.

Regarding dependent claims 25-31, 33-39, 41-47, 49-55, 57-63, 65-71, 73-79, and **81-87,** each directly or indirectly depends on its base claims 24, 32, 40, 48, 56, 64, 72, or 80, respectively, and is allowed at least due to its dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Amendment

6. Patent Owner's Response under 37 CFR 1.550 with an Amendment filed on May 16, 2022 in response to the Reexamination Non-Final Office action mailed on March 16, 2022 has been entered. The '551 patent claim 6 has been canceled and new claims 24-87 are maintained. Thus, claims 24-87 are pending, and they are considered in this reexamination proceeding.

Response to Arguments

7. **Claim limitation "electronic circuit apparatus …" in claims 6, 24, 32, 40, 48, 56, 64, 72 and 80 invokes 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112(6), and is read on the "logic control electronics unit 7" of the '551 patent disclosure, *id.* at Fig. 1, and col. 25:35-50.**

Applicant argued, see pages 2-3 of the May 16, 2022 Response, that the claim limitation "electronic circuitry apparatus" recited in claims 6, 24, 32, 40, 48, 56, 64, 72 and 80 does not invoke 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112(6) because of:

(i) The Federal Circuit has ruled that "the term 'circuit' coupled with a description in the claims of the circuit's operation typically conveys necessary structure." See e.g., *Linear Tech Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1230-21 (Fed. Cir. 2004), *Apex Inc. v. Raritan Comp., Inc.*, 325 F.3d 1364, 1374 (Fed. Cir. 2003). Cited MPEP 2181(I)(A).

(ii) The claim limitation "electronic circuitry apparatus" includes a generic placeholder "apparatus", which is modified by "sufficient structure … for performing the claimed function", i.e., "electronic circuitry", as such prong (C) is not satisfied and thus 112(6) does not apply; and that a "circuit" or "circuitry" are structural terms that have been found not to invoke 112(6), cited MPEP 2181(I)(A).

(iii) The specification is replete with examples of circuits and electronic circuitry (e.g., "The electric power … from the power source 1, or is conditioned within the DLF2, by power conditioning elements and circuitry 5"), which provide a sufficiently definite meaning as the name for structure that performs the function, cited MPEP 2181, and sic. col. 19, ll. 66-67; and "Thus, based on the claim language, the 'electronic circuitry apparatus for the controlled powering of the light source' is the 'light source controlling power circuitry' with which the 'controller' communicates", and that "while the electronic circuitry apparatus being part of the controller is a possible construction under 112(6) of 'electronic circuitry apparatus,'" Cited sic. col. 15, ll. 34-36.

Applicant's arguments have been fully considered but they are not persuasive.

(i) Firstly, the Federal Circuit has held that applicants (and reexamination patentees) before the USPTO have the opportunity and the obligation to define their inventions precisely during proceedings before the USPTO. See *In re Morris,* 127 F.3d 1048, 1056–57, 44 USPQ2d 1023, 1029–30 (Fed. Cir. 1997); *In re Zletz,* 893 F.2d 319, 322, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (manner of claim interpretation that is used by courts in litigation is not the manner of claim interpretation that is applicable during prosecution of a pending application before the USPTO); *Sage Prods., Inc. v. Devon Indus., Inc.,* 126 F.3d 1420, 1425, 44 USPQ2d 1103, 1107 (Fed. Cir. 1997) (patentee who had a clear opportunity to negotiate broader claims during prosecution but did not do so, may not seek to expand the claims through the doctrine of equivalents, for it is the patentee, not the public, who must bear the cost of failure to seek protection for this foreseeable alteration of its claimed structure). See MPEP 2181 (I.).

(ii) Secondly, the claim limitation "electronic circuitry apparatus" includes a non-structural generic placeholder "apparatus for", *id.* MPEP 2181 I (A), which is preceded by a non-structural modifier, i.e., "electronic circuitry", which does not have any generally understood structural meaning in the art, was not defined in the claim and/or the specification, had no dictionary definition, nor any generally understood meaning in the art; and thus, the term does not connote sufficient structure to a person of ordinary skill in the art to avoid 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112(6) treatment. See MPEP 2181 I.(C).

(iii) Lastly, based on the '551 patent prosecution history and the applicant's arguments above, the claim limitation "electronic circuitry apparatus for the controlled powering of the light source and other illuminating device elements" in claim 6 or its similar limitation in claims 24-87 is a controller described in a preferred embodiment as "logic control electronics unit 7" of the '551 patent disclosure, *id.* at Fig. 1, and col. 25:35-50.

Notice of Concurrent Proceeding(s)

8. With respect to the Report on the filing or determination on an action regarding a Patent or Trademark (Notice of Concurrent Proceeding(s)) under 35 U.S.C. § 290 and/or 15 U.S.C. § 1116, form AO 120, filed on 06/19/2022, the material has been considered with this action, and it has been placed in the prosecution file record.

9. Notice to the Patent Owner

MPEP § 2256 provides in pertinent part:

AFTER THE NOTICE OF INTENT TO ISSUE *EX PARTE* REEXAMINATION CERTIFICATE (NIRC):

Once the NIRC has been mailed, the reexamination proceeding is forwarded for publication of the reexamination certificate. Thus, when the patent owner provides a submission of patents and printed publications or other information described in **37 CFR 1.98(a)** after the NIRC has been mailed, the proceeding has entered the publication process for printing the reexamination certificate. To automatically delay prosecution by pulling the proceeding from that process when such a submission has been filed, without more, would be contrary to the Office's statutory mandate for "special dispatch", as set forth in **35 U.S.C. 305**.

For this reason, the submission must be accompanied by (A) a factual accounting providing a sufficient explanation of why the information submitted could not have been submitted earlier, (B) an unequivocal statement that one or more claims are unpatentable, and (C) an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable. This must be provided via a petition under **37 CFR 1.182** (with the petition fee) for entry and consideration of the information submitted after NIRC. These requirements are necessary to provide a basis for interrupting the proceeding after NIRC, in order for the Office to comply with its statutory mandate for "special dispatch".

CORRESPONDENCE AND INQUIRY AS TO OFFICE ACTIONS

10. All correspondence related to this ex parte reexamination proceeding should be directed as follows:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

For EFS-Web transmissions, 37 C.F.R. § 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 C.F.R. § 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the data of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry by the patent owner concerning this communication or earlier communications from the Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/HENRY N TRAN/
Primary Examiner, Art Unit 3992

Conferees:

/ANGELA M LIE/
Primary Examiner, Art Unit 3992

/ANDREW J. FISCHER/
Supervisory Patent Reexamination Specialist, Art Unit 3992

Reexamination	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
	Certificate Date	Certificate Number
		C1

Requester Correspondence Address: ☑ Patent Owner ☐ Third Party
Brooks Kushman 11000 Town Center 22nd Floor Southfield, MI 48075

LITIGATION REVIEW ☑	HT (examiner initials)	12 July 2022 (date)
Case Name		Director Initials
1:22cv751, Torchlight Technologies LLC V. Daimler Ag Et Al. - US Dist. Court. Delaware (open)		
1:22cv752, Torchlight Technologies LLC V. General Motors LLC Et Al. - US Dist. Court Delaware (Open)		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
Reissue 16/858,342 (suspended)	

/HENRY N TRAN/ Primary Examiner, Art Unit 3992	/ANGELA M LIE/ Primary Examiner, Art Unit 3992

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
	Examiner	Art Unit
	Henry Tran	3992

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Reviewed the 9,955,551 patent file's Prosecution History	02/17/2022	HT
Searched PTAB Trial Proceedings for US Patent 9,955,551	03/02/2022	HT
Reviewed/conferenced with PE. A. Lie and SPE. A. Fischer	03/03/2022 & 03/10/2022	HT
Searched PTAB Trial Proceedings for US Patent 9,955,551	07/12/2022	HT
Reviewed/conferenced with PE. A. Lie and SPE. A. Fischer	07/21/2022	

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/HENRY N TRAN/ Primary Examiner, Art Unit 3992	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
	Examiner	**Art Unit**
	Henry Tran	3992

CPC						
Symbol					**Type**	**Version**
F21S	/	41	/	147	F	2018-01-01
F21K	/	9	/	23	I	2016-08-01
H05B	/	45	/	395	I	2020-01-01
H05B	/	45	/	20	I	2020-01-01
B60Q	/	1	/	1423	I	2013-01-01
H05B	/	3	/	008	I	2013-01-01
B60Q	/	1	/	085	I	2013-01-01
F21K	/	9	/	232	I	2016-08-01
F21S	/	41	/	65	I	2018-01-01
F21V	/	23	/	0471	I	2013-01-01
H05B	/	47	/	115	I	2020-01-01
H05B	/	47	/	105	I	2020-01-01
B60Q	/	1	/	04	I	2013-01-01
A01K	/	1	/	00	I	2013-01-01
H05B	/	47	/	11	I	2020-01-01
F21S	/	41	/	43	I	2018-01-01
F21V	/	23	/	0464	I	2013-01-01
F21V	/	23	/	0478	I	2013-01-01
F21V	/	19	/	02	I	2013-01-01
H05B	/	47	/	10	I	2020-01-01
F21S	/	4	/	28	I	2016-01-01
F21S	/	41	/	153	I	2018-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	64	
/HENRY N TRAN/ Primary Examiner, Art Unit 3992	19 July 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	24	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220707

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
	Examiner	**Art Unit**
	Henry Tran	3992

INTERNATIONAL CLASSIFICATION				
CLAIMED				
F21S41/147	/	41	/	147
B60Q1/08	/	1	/	08
F21S41/65	/	41	/	65
H05B47/115	/	47	/	115
H05B47/105	/	47	/	105
B60Q1/04	/	1	/	04
H05B47/11	/	47	/	11
F21S41/43	/	41	/	43
F21V19/02	/	19	/	02
H05B47/10	/	47	/	10

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					
315	77	307	312	152		

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 64	
/HENRY N TRAN/ Primary Examiner, Art Unit 3992 (Primary Examiner)	19 July 2022 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

U.S. Patent and Trademark Office — Part of Paper No.: 20220707

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,815	9955551B2
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	Henry Tran	3992

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	12	12	23	23	34	34	45	45	56	56	67	67	78	78
2	2	13	13	24	24	35	35	46	46	57	57	68	68	79	79
3	3	14	14	25	25	36	36	47	47	58	58	69	69	80	80
4	4	15	15	26	26	37	37	48	48	59	59	70	70	81	81
5	5	16	16	27	27	38	38	49	49	60	60	71	71	82	82
-	6	17	17	28	28	39	39	50	50	61	61	72	72	83	83
7	7	18	18	29	29	40	40	51	51	62	62	73	73	84	84
8	8	19	19	30	30	41	41	52	52	63	63	74	74	85	85
9	9	20	20	31	31	42	42	53	53	64	64	75	75	86	86
10	10	21	21	32	32	43	43	54	54	65	65	76	76	87	87
11	11	22	22	33	33	44	44	55	55	66	66	77	77		

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 64	
/HENRY N TRAN/ Primary Examiner, Art Unit 3992 (Primary Examiner)	19 July 2022 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20220707

Bibliographic Data

Application No: 90/014,815

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /HENRY N TRAN/ (Examiner's Signature) | (Initials)

Title: Detector Controlled Illuminating System

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
07/30/2021	315	3992	TRCH0102RX
RULE			

APPLICANTS

INVENTORS

9955551B2,

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PATENT OWNER,

CONTINUING DATA

This application is a REX of 13357549 01/24/2012 PAT 9955551

13357549 has PRO of 61535981 09/17/2011

13357549 is a CIP of 10604360 07/14/2003 PAT 8100552

10604360 has PRO of 60395308 07/12/2002 *

(*) Data provided by applicant is not consistent with PTO record

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

STATE OR COUNTRY

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22nd Floor
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FILING FEE RECEIVED

$225

Electronic Acknowledgement Receipt

EFS ID:	46358390
Application Number:	90014815
International Application Number:	
Confirmation Number:	6654
Title of Invention:	Detector Controlled Illuminating System
First Named Inventor/Applicant Name:	9955551B2
Customer Number:	22045
Filer:	Sangeeta G Shah/Fiona Archer
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Receipt Date:	08-AUG-2022
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Time Stamp:	09:52:36
Application Type:	Reexam (Patent Owner)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Patent Owner Comments after Action Closing Prosecution	TRCH0102RX_Patent_Owners_Statement_Order_Response.pdf	117805 d242c09f945a678b6bf63bcbc7f6c7e30143e0ef	no	2

Warnings:

Information:	
Total Files Size (in bytes):	117805

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

US009955551C1

(12) EX PARTE REEXAMINATION CERTIFICATE (12119th)

United States Patent
Spero

(10) Number: US 9,955,551 C1
(45) Certificate Issued: Aug. 19, 2022

(54) **DETECTOR CONTROLLED ILLUMINATING SYSTEM**

(76) Inventor: **Yechezkal Evan Spero**, Moshav Tifrach (IL)

Reexamination Request:
No. 90/014,815, Jul. 30, 2021

Reexamination Certificate for:
Patent No.: **9,955,551**
Issued: **Apr. 24, 2018**
Appl. No.: **13/357,549**
Filed: **Jan. 24, 2012**

Related U.S. Application Data

(63) Continuation-in-part of application No. 10/604,360, filed on Jul. 14, 2003, now Pat. No. 8,100,552.
(Continued)

(51) **Int. Cl.**

F21S 41/147	(2018.01)
B60Q 1/08	(2006.01)
F21S 41/65	(2018.01)
H05B 47/115	(2020.01)
H05B 47/105	(2020.01)
B60Q 1/04	(2006.01)
H05B 47/11	(2020.01)
F21S 41/43	(2018.01)
F21V 19/02	(2006.01)
H05B 47/10	(2020.01)
F21K 9/23	(2016.01)
H05B 45/395	(2020.01)
H05B 45/20	(2020.01)
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F21K 9/232	(2016.01)
F21V 23/04	(2006.01)

(Continued)

(52) **U.S. Cl.**
CPC ***F21S 41/147*** (2018.01); ***A01K 1/00*** (2013.01); ***B60Q 1/04*** (2013.01); ***B60Q 1/085*** (2013.01); ***B60Q 1/1423*** (2013.01); ***F21K 9/23*** (2016.08); ***F21K 9/232*** (2016.08); ***F21S 4/28*** (2016.01); ***F21S 41/153*** (2018.01); ***F21S 41/43*** (2018.01); ***F21S 41/65*** (2018.01); ***F21V 19/02*** (2013.01); ***F21V 23/0464*** (2013.01); ***F21V 23/0471*** (2013.01); ***F21V 23/0478*** (2013.01); ***H05B 3/008*** (2013.01); ***H05B 45/20*** (2020.01); ***H05B 45/395*** (2020.01); ***H05B 47/10*** (2020.01); ***H05B 47/105*** (2020.01); ***H05B 47/11*** (2020.01); ***H05B 47/115*** (2020.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

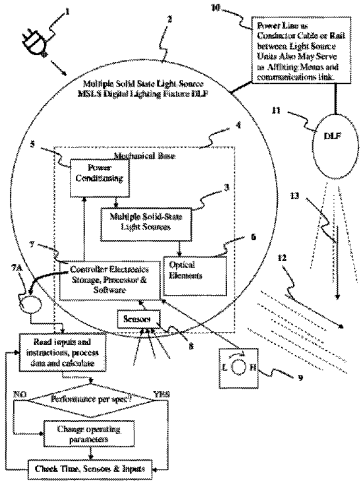
To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/014,815, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

Primary Examiner — Henry N Tran

(57) **ABSTRACT**

An illuminating device coupled with sensors or an image acquisition device and a logical controller allows illumination intensity and spectrum to be varied according to changing user needs. The system provides illumination to areas according to the principles of correct lighting practice for the optimal performance of visual tasks in the most efficient, cost effective manner. Aspects of the invention include: lighting fixtures which adapt to ambient lighting, movement, visual tasks being performed, and environmental and personal conditions affecting illumination requirements at any given instant. Lighting fixtures having spatial distribution of spectrum and intensity, providing both "background" room lighting, and "task" lighting.

At the time of issuance and publication of this certificate, the patent remains subject to pending reissue application number 16/858,342 filed Apr. 24, 2020. The claim content of the patent may be subsequently revised if a reissue patent is issued from the reissue application.



Related U.S. Application Data

(60) Provisional application No. 61/535,981, filed on Sep. 17, 2011, provisional application No. 60/395,308, filed on Jul. 12, 2002.

(51) **Int. Cl.**

A01K 1/00	(2006.01)
F21S 4/28	(2016.01)
F21S 41/153	(2018.01)

EX PARTE REEXAMINATION CERTIFICATE

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **6** is cancelled.

New claims **24-87** are added and determined to be patentable.

Claims **1-5** and **7-23** were not reexamined.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on die structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine coordinates corresponding to an other vehicle, based on the coordinate-specific information;

select a cluster of the LEDs that emit light toward at portion of the other vehicle based on the LEDs having emission aimings associated with the first coordinates; and

change emission of the selected cluster of LEDs relative to emission of other LEDs not included in the cluster to create headlamp illumination that preserves a first level of illumination illuminating past the other vehicle while preventing glare to a driver of the other vehicle.

25. The illuminating device of claim 24, wherein:

the changed emission includes a change to at least one of intensity Or color or a change of at least one LED of the cluster to a non-emitting state; and

the cluster includes a plurality of the LEDs and the cluster non-contiguous LEDs.

26. The illuminating device of claim 24, wherein the memory further stores instructions that when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.

27. The illuminating device of claim 26, wherein:

the changed emission includes a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state;

the cluster includes a plurality of the LEDS and the cluster includes non-contiguous LEDs; and

the memory further stores instructions that, when executed one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

28. The illuminating device claim 26, wherein identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

29. The illuminating device of claim 26, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

30. The illuminating device of claim 24, further including one or more optical control elements to control light emitted from one or more of the LEDs.

31. The illuminating device of claim 30, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

electronic circuitry apparatus for t controlled powering of the LEDS and other of the illuminating device elements;

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least one target, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated

from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

create a beam of diminished illumination illuminating at least a portion of the at least one target with non-glaring illumination, created in a broader field of illumination having different intensity than the beam, by one or more changes to characteristics of first light of a cluster of the LEDs providing the first light directed at the at least a portion and creating the beam, the beam diminished in intensity relative to the broader field of illumination illuminating at least above and on both sides of the beam; and

follow, based at least in part on data from one or more of the cameras, the at least one target with the diminished illumination as the at least one target changes location relative to the motor vehicle.

33. The illuminating device of claim 32 wherein:

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select the cluster of LEDs based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp;

the data includes image data;

the one or more changes to characteristics of the first light include a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state; and

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDS.

34. The illuminating device of claim 32, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identity an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.

35. The illuminating device of claim 14, wherein:

the one or more changes to characteristics of the first light include a change to at least one of intensity or color or a change of at least one LED of the cluster to a non-emitting state;

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select the cluster of LEDs based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

36. The illuminating device of claim 34 wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

37. The illuminating device of claim 34, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

38. The illuminating device of claim 32, further including one or more optical control elements to control light emitted from one or more of the LEDs.

39. The illuminating device of claim 38, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least two other vehicles, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine a list cluster of the LEDs illuminating at least a first portion of a first other vehicle based at least in part on data from one or more of the sensors indicating a first position associated with the first other vehicle;

diminish glaring illumination of the first other vehicle by a first change to one or more characteristics of first light of at least the first cluster;

determine a second, different cluster of the LEDs illuminating at least a second portion of a second other vehicle based at least in part on the data indicating a second position associated with the second other vehicle;

diminish glaring illumination of the second other vehicle by a second change to one or more characteristics of second light of at least the second, different cluster;

wherein the first and second changes decrease intensity of first emission from the first cluster and second emission from the second cluster relative to a third emission, from the at least one headlamp, illuminating an area between the first and second portion.

41. The illuminating device of claim 40, wherein:

the data includes image data;

at least one of first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a chance to color, to intensity, or a change of at least one LEDs of the respective cluster to a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the determination of the first cluster includes selection of the first cluster based at least in part on known aimings of light associated with the first cluster having a correlation to the first position, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the determination of the second cluster includes selection of the second cluster based at least in part on known aimings light associated with the second cluster having a correlation to the second position, the known aimings based at least in part on at least one of known directionality of light emitted by the second cluster or known directionality of light emitted by the second cluster exiting the headlamp.

42. The illuminating device of claim 40, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the at least one headlamps.

43. The illuminating device of claim 42, wherein:

at least one of the first or second change to characteristics of the associate with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at one LED of the respective cluster to a non-emitting state;

at least one of the cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the determination of the first cluster includes selection of title first cluster based at least in part on known aimings of light associated with the first cluster having a correlation to the first position, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp;

the determination of the second cluster includes selection of the second cluster based at least in part on known aimings of light associated with the second cluster having a correlation to the second position, the known aimings based at least in part on at least one of known directionality of light emitted by the second cluster or known directionality of light emitted by the second cluster exiting the headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of light pattern in at least one of color, intensity or spatial distribution by modification of associated with one or more of the LEDs.

44. The illuminating device of claim 42, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

45. The illuminating device of claim 42, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the pattern is based at least in part on the sensor data.

46. The illuminating device of claim 40, further including one or more optical control element to control light emitted from one or more of the LEDs.

47. The illuminating device of claim 46, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller including at least one o the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information, communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

illuminate a portion of at least one object, indicated by data from at least one of the one or more sensors, by selecting a first cluster of the LEDs to emit first light directed towards a first area including the at least the portion of at least one object, the first area determined based at least in part on the data, the first cluster selected based at least in part on known aimings of light associated with the first cluster determined to correspond to the first area, and the first light determined based at least in part on classifying the object based at least in part on the data; and control light emitted from the first cluster directed towards the first area to be different in at least one emission characteristic, based on the first

light determination, from second light emitted from a second, different cluster of the LEDs, directed towards one or more illuminated second areas at a common elevation with the first area and laterally adjacent to the area.

49. The illuminating device of claim 48, wherein:

the data includes image data;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to illuminate the at least the portion with light below at least a predefined glare level;

the at least one object includes at least one of a pedestrian, a sign, or another vehicle;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the control of the light emitted from the first cluster includes a change of at least one LED of the cluster to a non-emitting state;

the at least one emission characteristic is different following modification by an optical control element; and

the known aimings of light associated with the first cluster is at east on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp.

50. The illuminating device of claim 48, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

51. The illuminating device of claim 50, wherein:

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to illuminate the at least the portion with light below at least a predefined glare level;

the at least one object includes at least one of a pedestrian, a sign, or another vehicle;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the control of the light emitted from the first cluster includes a change of at least one LED of the cluster to a non-emitting state;

the at least one emission characteristic is different following modification by an optical control element;

the known aimings of light associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

52. The illuminating device of claim 50, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the pattern is based at least in part on the map data.

53. The illuminating device of claim 50, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

54. The illuminating device of claim 48, further including one or more optical control elements to control emitted from one or more of the LEDs.

55. The illuminating device of claim 54, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, place on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of at least one other vehicle ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one o the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine, based on data from one or more of the sensors, a vertical and horizontal position associated with the at least one other vehicle;

select a first cluster of the LEDs based at least in part on at least one of the vertical and horizontal position compared to known aimings of light associated with the first cluster; and

reduce intensity of illumination to non-glaring illumination of a first area associated with the at least one other vehicle, relative intensity of illumination on both sides of the first area at elevations common with the first area illuminated by a second cluster of the LEDs, by control of emission from the first cluster.

57. The illuminating device of claim 56, wherein:

the data includes image data;

the control of emission of the first cluster includes a change of at least one of color or intensity or control of at least one LED of the first cluster into a non-emitting state;

at least one of the first cluster second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs; and

the known light aimings associated with the first cluster is based at least on art on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp.

58. The illuminating device of claim 56 wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

59. The illuminating device of claim 58, wherein:

the control of emission of the first cluster includes a change of least one of color or intensity or control of at least one LED of the first cluster into a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the known light aiming associated with the first cluster is based at least on part on known directionality of light emitted by LEDs of the first cluster exiting from the at least one headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

60. The illuminating device of claim 58, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

61. The illuminating device of claim 58, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

62. The illuminating device of claim 56, further including one or more optical control elements to control light emitted from one or more of the LEDs.

63. The illuminating device of claim 62, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs and in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area and positioned to capture an image of another vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

select a first cluster of the LEDs having light associated there that is directed towards the other vehicle based at least in part on first data from one or more of the sensors indicating a first position associated with the other vehicle;

control a first change to one or more characteristics of the light associated with the first cluster of the LEDs that is directed towards the other vehicle, that diminishes glare to a driver of the other vehicle when the other vehicle is at the first position;

select a second, different cluster of the LEDs having light associated therewith that is directed towards the other vehicle based at least in part on second, subsequent data from one or more of the sensors indicating a second, subsequent position associated with the other vehicle; and

control a second, subsequent change, to one or more characteristics of the light that is subsequently directed towards the other vehicle, that diminishes glare to the driver of the other vehicle when the other vehicle is at the second position.

65. The illuminating device of claim 64, wherein:

the first data or second data includes image data;

at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED respective cluster to a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of he first cluster or the second cluster includes non-contiguous LEDs; and

the light that is directed or subsequently directed towards the other vehicle is determined based at least in part on known directionality of light emitted by the respective first or second cluster exiting the at least one headlamp.

66. The illuminating device of claim 64, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

67. The illuminating device of claim 66, wherein:

at least one of the first or second change to characteristics of light associated with at least one of the first or second cluster of LEDs includes at least one of a change to color, to intensity, or a change of at least one LED of the respective duster to a non-emitting state;

at least one of the first cluster or the second cluster includes a plurality of the LEDs and at least one of the first cluster or the second cluster includes non-contiguous LEDs;

the light that is directed or subsequently directed towards the other vehicle is determined based at least in part on known directionality of light emitted by the respective first or second cluster exiting the at least one headlamp; and

the memory further stores instructions that, when executed one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

68. The illuminating device of claim 66, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

69. The illuminating device of claim 66, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

70. The illuminating device of claim 64, further including one or more optical control elements to control light emitted from one or more of the LEDs.

71. The illuminating device of claim 70, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, placed on the structure for detecting coordinate-specific information about the illuminated area, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

determine a target based on first data from one or more of the sensors;

determine a first target location based on the first data;

select a cluster of the LEDs having light associated therewith that is directed at the target, determined based on the first target location;

vary illumination provided to the target by the selected cluster, relative to illumination provided to areas laterally adjacent to the target and provided by at least one LED different from LEDs in the selected cluster; and

maintain a variance of illumination provided to the target relative to the laterally adjacent areas, when subsequent data from one or more of the cameras indicates a change in position of the target relative to the motor vehicle, by repeating the determination of target location, selection of the cluster and variance to illumination provided to the target, relative to the laterally adjacent areas, based on the subsequent data.

73. The illuminating device of claim. 72, wherein:

the variation of illumination provided to the target includes variation in at least one of color or intensity at least a change of at least one LED of the selected cluster to a non-emitting state;

the cluster includes a plurality of the LEDs and the cluster includes non-contiguous LEDs;

the light directed at the target is determined based at least in part on known directionality of light emitted by the first cluster exiting from the at least one headlamp; and

at least one of the first data or the subsequent data includes image data.

74. The illuminating device of claim 72, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identity an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodated the upcoming road curvature by adaptation of a light pattern of at least one of the headlamps.

75. The illuminating device of claim 74, wherein:

the variation of illumination provided to the target includes variation in at least one of color or intensity or at least a change of at least one LED of the selected cluster to a non-emitting state

the selected cluster includes a plurality of the LEDs and the selected cluster includes non-contiguous LEDs;

the light directed at the target is determined based at least in part on known directionality of light emitted by the first cluster exiting from the at least one headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

76. The illuminating device of claim 74, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

77. The illuminating device of claim 74, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

78. The illuminating device of claim 72, further including one or more optical control elements to control light emitted from one or more of the LEDs.

79. The illuminating device of claim 78 wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

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

a structure for incorporating illuminating device elements, wherein the structure comprises a motor vehicle;

a plurality of individually controllable LEDs incorporated in the structure via at least one headlamp mounted to the structure, each headlamp including at least one of the LEDs, the LEDs in communication with a power source;

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

one or more processors;

one or more sensors, including one or more cameras, place on the structure or detecting coordinate-specific information about the illuminated area and positioned to capture camera data indicating a target ahead of the motor vehicle, at least one of said cameras in communication with power, and in communication with at least one of the one or more processors;

a controller, including at least one of the one or more processors, integrated with the structure via mounting, in communication with the LED controlling power electronic circuitry apparatus, said controller arranged to process the information communicated from the cameras and to automatically control the light provided to the illuminated area; and

memory storing instructions that, when executed by one or more processors of the controller, enable the controller to:

identify, based on data received from one or more of the sensors, a plurality of positions associated with the target as the target move relative to the motor vehicle; and

change, responsive to the positions associated with the target, first light associated with one or more LEDs aimed toward at least a portion of the target, relative to second light associated with other one or more of the LEDs aimed laterally adjacent the target on either side, as the target moves relative to the motor vehicle.

81. The illuminating device of claim 80, wherein:

the data includes image data;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select a first cluster of LEDs, associated with the first light, for the change, based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the change to emission of one or more LEDs aimed to towards the at least the portion includes a change to intensity or color or a chance of a least one of the LEDs to a non-emitting state.

82. The illuminating device of claim 80, wherein the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to:

identify an upcoming road curvature along a road on which the motor vehicle is traveling; and

accommodate the upcoming road curvature by adaptation of a light pattern of least one of the at least one headlamps.

83. The illuminating device of claim 82, wherein:

the change to emission of the one or more LEDs aimed towards the at least the portion includes a change to intensity or color or a change of at least one of the LEDs to a non-emitting state;

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to select a first cluster of LEDs, associated with the first light, for the change, based at least in part on known aimings of the first light associated with the first cluster having a correlation to the at least the portion, the known aimings based at least in part on at least one of known directionality of light emitted by the first cluster or known directionality of light emitted by the first cluster exiting the headlamp; and

the memory further stores instructions that, when executed by one or more processors of the controller, enable the controller to accommodate the road curvature by changing illumination in at least a direction of the road curvature by adaptation of the light pattern in at least one of color, intensity or spatial distribution by modification of light associated with one or more of the LEDs.

84. The illuminating device or claim 82, wherein the identification of the upcoming road curvature is based at least in part on map data and wherein the adaptation of the light pattern is based at least in part on the map data.

85. The illuminating device of claim 82, wherein the identification of the upcoming road curvature is based at least in part on sensor data provided by one or more of the sensors of the vehicle and wherein the adaptation of the light pattern is based at least in part on the sensor data.

86. The illuminating device of claim 80, further including one or more optical control elements to control light emitted from one or more of the LEDs.

87. The illuminating device of claim 86, wherein the optical control elements include at least one of one or more reflectors, refractors or lenses.

* * * * *

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

YECHEZKAL EVAN SPERO

Group Art Unit: 3992

Examiner: TRAN, HENRY N.

Serial No.: 90/014,815

Filed: July 30, 2021

For: DETECTOR CONTROLLED ILLUMINATING SYSTEM

Attorney Docket No.: TRCH0102RX

REQUEST FOR CERTIFICATE OF CORRECTION

Attention Certificate of Correction Branch
Commissioner for Patents
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

It is requested that a Certificate of Correction be issued for the above-identified patent under the provisions of 37 C.F.R. § 1.322. The corrections noted are as follows:

Column 1, Line 36, Claim 24:
(Page 1, Line 11, Claim 24: Exhibit OTH-C, New Claims dated July 30, 2021):

After "placed on"
Delete "die" and
Insert – the --.

Column 1, Line 43, Claim 24:
(Page 1, Line 16, Claim 24: Exhibit OTH-C, New Claims dated July 30, 2021):

After "in communication with the"
Insert – LED --.

Column 1, Lines 54-55, Claim 24:
(Page 1, Line 23, Claim 24: Exhibit OTH-C, New Claims dated July 30, 2021):

After "that emit light toward at"
Insert – least a--.

Column 1, Lines 65-66, Claim 25:
(Page 2, Line 2, Claim 25: Exhibit OTH-C, New Claims dated July 30, 2021):

After "to at least one of intensity"
Delete "Or" and
Insert – or --.

Column 2, Lines 1-2, Claim 25:
(Page 2, Line 4, Claim 25: Exhibit OTH-C, New Claims dated July 30, 2021):

After "plurality of the LEDs and the cluster"
Insert – includes --.

Column 2, Line 4, Claim 26:
(Page 2, Lines 1-2, Claim 26: Exhibit OTH-C, New Claims dated July 30, 2021):

After "memory further stores instructions"
Delete "that" and
Insert – that, -- (comma).

Column 2, Line 17, Claim 27:
(Page 2, Line 4, Claim 27: Exhibit OTH-C, New Claims dated July 30, 2021):

After "the cluster includes a plurality of the"
Delete "LEDS" and
Insert – LEDs --.

Column 2, Lines 19-20, Claim 27:
(Page 2, Line 6, Claim 27: Exhibit OTH-C, New Claims dated July 30, 2021):

After "that, when executed"
Insert – by --.

Column 2, Line 27, Claim 28:
(Page 2, Line 1, Claim 28: Exhibit OTH-C, New Claims dated July 30, 2021):

After "The illuminating device "
Insert – of --.

Column 2, Line 27, Claim 28:
(Page 2, Line 1, Claim 28: Exhibit OTH-C, New Claims dated July 30, 2021):

After "claim 26, wherein"
Insert – the --.

Column 2, Line 47, Claim 32:
(Page 3, Line 5, Claim 32: Exhibit OTH-C, New Claims dated July 30, 2021):

Before "plurality of individually controllable LEDs"
Insert – a --.

Column 2, Line 52, Claim 32:
(Page 3, Line 8, Claim 32: Exhibit OTH-C, New Claims dated July 30, 2021):

After "electronic circuitry apparatus for"
Delete "t" and
Insert – the --.

Column 3, Line 37, Claim 33:
(Page 4, Line 11, Claim 33: Exhibit OTH-C, New Claims dated July 30, 2021):

After "and the cluster includes non-contiguous"
Delete "LEDS" and
Insert – LEDs --.

Column 3, Line 47, Claim 35:
(Page 5, Line 1, Claim 35: Exhibit OTH-C, New Claims dated July 30, 2021):

After "The illuminating device of claim"
Delete "14" and
Insert – 34 --.

Column 4, Line 5, Claim 36:
(Page 5, Line 1, Claim 36: Exhibit OTH-C, New Claims dated July 30, 2021):

After "The illuminating device of claim"
Delete "34" and
Insert – 34, -- (comma).

Column 4, Line 28, Claim 40:
(Page 6, Lines 6-7, Claim 40: Exhibit OTH-C, New Claims dated July 30, 2021):

After "the LEDs in communication"
Insert – with --.

Column 4, Line 51, Claim 40:
(Page 6, Line 21, Claim 40: Exhibit OTH-C, New Claims dated July 30, 2021):

After "determine a"
Delete "list" and
Insert – first --.

Column 5, Line 10, Claim 41:
(Page 7, Line 4, Claim 41: Exhibit OTH-C, New Claims dated July 30, 2021):

After "includes at least one of a"
Delete "chance" and
Insert – change --.

Column 5, Lines 26-27, Claim 41:
(Page 7, Line 13, Claim 41: Exhibit OTH-C, New Claims dated July 30, 2021):

After "at least in part on known aimings"
Insert – of --.

Column 5, Lines 43-44, Claim 43:
(Page 8, Line 2, Claim 43: Exhibit OTH-C, New Claims dated July 30, 2021):

After "at least one of the first or second change to characteristics of"
Delete "the associate" and
Insert – light associated --.

Column 5, Line 46, Claim 43:
(Page 8, Line 4, Claim 43: Exhibit OTH-C, New Claims dated July 30, 2021):

After "to intensity, or a change of at"
Insert – least --.

Column 5, Line 48, Claim 43:
(Page 8, Line 5, Claim 43: Exhibit OTH-C, New Claims dated July 30, 2021):

After "at least one of the"
Insert – first --.

Column 5, Lines 52-53, Claim 43:
(Page 8, Line 7, Claim 43: Exhibit OTH-C, New Claims dated July 30, 2021):

After "the determination of the first cluster includes selection of"
Delete "title" and
Insert – the --.

Column 6, Line 7, Claim 43:
(Page 8, Line 19, Claim 43: Exhibit OTH-C, New Claims dated July 30, 2021):

After "modification of"
Insert – light --.

Column 6, Line 19, Claim 46:
(Page 8, Lines 1-2, Claim 46: Exhibit OTH-C, New Claims dated July 30, 2021):

After "one or more optical control"
Delete "element" and
Insert – elements --.

Column 6, Line 44, Claim 48:
(Page 9, Line 14, Claim 48: Exhibit OTH-C, New Claims dated July 30, 2021):

After "a controller, including at least one"
Delete "o" and
Insert – of --.

Column 8, Lines 28-29, Claim 56:
(Page 12, Line 11, Claim 56: Exhibit OTH-C, New Claims dated July 30, 2021):

After "including one or more cameras,"
Delete "place" and
Insert – placed --.

Column 8, Line 35, Claim 56:
(Page 12, Line 15, Claim 56: Exhibit OTH-C, New Claims dated July 30, 2021):

After "a controller, including at least one"
Delete "o" and
Insert – of --.

Column 8, Lines 53-54, Claim 56:
(Page 12, Line 27, Claim 56: Exhibit OTH-C, New Claims dated July 30, 2021):

After "with the at least one other vehicle, relative"
Insert – to --.

Column 8, Line 64, Claim 57:
(Page 13, Line 5, Claim 57: Exhibit OTH-C, New Claims dated July 30, 2021):

After "at least one of the first cluster "
Insert – or the --.

Column 9, Line 2, Claim 57:
(Page 13, Line 7, Claim 57: Exhibit OTH-C, New Claims dated July 30, 2021):

After "based at least on "
Delete "art" and
Insert – part --.

Column 9, Line 23, Claim 59:
(Page 13, Line 6, Claim 59: Exhibit OTH-C, New Claims dated July 30, 2021):

After "the known light"
Delete "aiming" and
Insert – aimings --.

Column 10, Lines 14-15, Claim 64:
(Page 15, Line 7, Claim 64: Exhibit OTH-C, New Claims dated July 30, 2021):

After "having light associated"
Delete "there" and
Insert – therewith --.

Column 10, Lines 40-41, Claim 65:
(Page 15, Line 5, Claim 65: Exhibit OTH-C, New Claims dated July 30, 2021):

After "change of at least one LED"
Insert – of the --.

Column 10, Line 43, Claim 65:
(Page 15, Lines 6-7, Claim 65: Exhibit OTH-C, New Claims dated July 30, 2021):

After "and at least one of"
Delete "he" and
Insert –the --.

Column 10, Lines 62-63, Claim 67:
(Page 16, Line 4, Claim 67: Exhibit OTH-C, New Claims dated July 30, 2021):

After "or a change of at least one LED of the respective"
Delete "duster" and
Insert – cluster --.

Column 11, Lines 6-7, Claim 67:
(Page 16, Line 10, Claim 67: Exhibit OTH-C, New Claims dated July 30, 2021):

After "the memory further stores instructions that, when executed"
Insert – by --.

Column 12, Lines 15-16, Claim 73:
(Page 18, Lines 2-3, Claim 73: Exhibit OTH-C, New Claims dated July 30, 2021):

After "in at least one of color or intensity"
Insert – or --.

Column 12, Lines 27-29, Claim 74:
(Page 18, Lines 2-2, Claim 74: Exhibit OTH-C, New Claims dated July 30, 2021):

After "by the one or more processors of the controller, enable the controller to:"
Delete "identity" and
Insert – identify --.

Column 12, Lines 30-31, Claim 74:
(Page 18, Lines 3-5, Claim 74: Exhibit OTH-C, New Claims dated July 30, 2021):

After "a road on which the motor vehicle is traveling; and"
Delete "accommodated" and
Insert – accommodate --.

Column 12, Line 37, Claim 75:
(Page 18, Line 3, Claim 75: Exhibit OTH-C, New Claims dated July 30, 2021):

After "cluster to a non-emitting"
Delete "state" and
Insert – state; --.

Column 13, Lines 13-14, Claim 80:
(Page 20, Line 2, Claim 80: Exhibit OTH-C, New Claims dated July 30, 2021):

After "one or more sensors, including one or more cameras,"
Delete "place" and
Insert – placed --.

Column 13, Line 14, Claim 80:
(Page 20, Line 2, Claim 80: Exhibit OTH-C, New Claims dated July 30, 2021):

After "on the structure"
Delete "or" and
Insert – for --.

Column 13, Line 31-32 Claim 80:
(Page 20, Line 13, Claim 80: Exhibit OTH-C, New Claims dated July 30, 2021):

After "associated with the target as the target"
Delete "move" and
Insert – moves --.

Column 14, Lines 2-3, Claim 81:
(Page 20, Line 10, Claim 81: Exhibit OTH-C, New Claims dated July 30, 2021):

After "a change to intensity or color or a"
Delete "chance" and
Insert – change --.

Column 14, Line 38, Claim 84:
(Page 21, Line 1, Claim 84: Exhibit OTH-C, New Claims dated July 30, 2021):

After "The illuminating device"
Delete "or" and
Insert – of --.

It is requested that a Certificate of Correction be issued for the above-identified patent under the provisions of 37 C.F.R. § 1.323. The corrections noted are as follows:

Column 6, Lines 47-48, Claim 48:
(Page 9, Lines 15-16, Claim 48: Exhibit OTH-C, New Claims dated July 30, 2021):

After "said controller arranged to process the"
Delete "information," and
Insert – information --.

Column 7, Lines 25-26, Claim 49:
(Page 10, Line 13, Claim 49: Exhibit OTH-C, New Claims dated July 30, 2021):

After "associated with the first cluster is"
Delete "at east on" and
Insert – based at least in --.

Column 7, Lines 54-55, Claim 51:
(Page 11, Line 12, Claim 51: Exhibit OTH-C, New Claims dated July 30, 2021):

After "associated with the first cluster is based at least"
Delete "on" and
Insert – in--.

Column 9, Line 2, Claim 57:
(Page 13, Line 7, Claim 57: Exhibit OTH-C, New Claims dated July 30, 2021):

After "based at least"
Delete "on art" and
Insert – in part --.

Column 9, Lines 23-24, Claim 59:
(Page 13, Line 6, Claim 59: Exhibit OTH-C, New Claims dated July 30, 2021):

After "with the first cluster is based at least"
Delete "on" and
Insert – in --.

Applicant requests a Certificate of Correction under 37 C.F.R. § 1.323 to correct errors of minor character. The corrections do not involve changes which introduce new matter or require re-examination. The applicable fee of $160 pursuant to 37 C.F.R. § 1.20(a) is being charged to our Deposit Account No. 02-3978 via electronic authorization submitted concurrently herewith. The Commissioner is hereby authorized to charge any additional fees to our Deposit Account No. 02-3978.

Filed herewith is the form for Certificate of Correction (PTO/SB/44). The Commissioner is hereby authorized to charge any additional fees to our Deposit Account No. 02-3978.

Respectfully submitted,

YECHEZKAL EVAN SPERO

By: /Sangeeta G. Shah/
Sangeeta G. Shah
Reg. No. 38,614
Attorney/Agent for Applicant

Date: September 12, 2022

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.:
APPLICATION NO.: 90/014815
ISSUE DATE:
INVENTOR(S): YECHEZKAL EVAN SPERO (et al.)

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 1, Line 36, Claim 24:

After "placed on"
Delete "die" and
Insert – the --.

Column 1, Line 43, Claim 24:

After "in communication with the"
Insert – LED --.

Column 1, Lines 54-55, Claim 24:

After "that emit light toward at"
Insert – least a--.

Column 1, Lines 65-66, Claim 25:

After "to at least one of intensity"
Delete "Or" and
Insert – or --.

Column 2, Lines 1-2, Claim 25:

After "plurality of the LEDs and the cluster"
Insert – includes --.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

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Column 2, Line 4, Claim 26:

After "memory further stores instructions"
Delete "that" and
Insert – that, -- (comma).

Column 2, Line 17, Claim 27:

After "the cluster includes a plurality of the"
Delete "LEDS" and
Insert – LEDs --.

Column 2, Lines 19-20, Claim 27:

After "that, when executed"
Insert – by --.

Column 2, Line 27, Claim 28:

After "The illuminating device "
Insert – of --.

Column 2, Line 27, Claim 28:

After "claim 26, wherein"
Insert – the --.

Column 2, Line 47, Claim 32:

Before "plurality of individually controllable LEDs"
Insert – a --.

Column 2, Line 52, Claim 32:

After "electronic circuitry apparatus for"
Delete "t" and
Insert – the --.

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Column 3, Line 37, Claim 33:

After "and the cluster includes non-contiguous"
Delete "LEDS" and
Insert – LEDs --.

Column 3, Line 47, Claim 35:

After "The illuminating device of claim"
Delete "14" and
Insert – 34 --.

Column 4, Line 5, Claim 36:

After "The illuminating device of claim"
Delete "34" and
Insert – 34, -- (comma).

Column 4, Line 28, Claim 40:

After "the LEDs in communication"
Insert – with --.

Column 4, Line 51, Claim 40:

After "determine a"
Delete "list" and
Insert – first --.

Column 5, Line 10, Claim 41:

After "includes at least one of a"
Delete "chance" and
Insert – change --.

Column 5, Lines 26-27, Claim 41:

After "at least in part on known aimings"
Insert – of --.

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Column 5, Lines 43-44, Claim 43:

After "at least one of the first or second change to characteristics of"
Delete "the associate" and
Insert – light associated --.

Column 5, Line 46, Claim 43:

After "to intensity, or a change of at"
Insert – least --.

Column 5, Line 48, Claim 43:

After "at least one of the"
Insert – first --.

Column 5, Lines 52-53, Claim 43:

After "the determination of the first cluster includes selection of"
Delete "title" and
Insert – the --.

Column 6, Line 7, Claim 43:

After "modification of"
Insert – light --.

Column 6, Line 19, Claim 46:

After "one or more optical control"
Delete "element" and
Insert – elements --.

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Column 6, Line 44, Claim 48:

After "a controller, including at least one"
Delete "o" and
Insert – of --.

Column 6, Lines 47-48, Claim 48:

After "said controller arranged to process the"
Delete "information," and
Insert – information --.

Column 7, Lines 25-26, Claim 49:

After "associated with the first cluster is"
Delete "at east on" and
Insert – based at least in --.

Column 7, Lines 54-55, Claim 51:

After "associated with the first cluster is based at least"
Delete "on" and
Insert – in--.

Column 8, Lines 28-29, Claim 56:

After "including one or more cameras,"
Delete "place" and
Insert – placed --.

Column 8, Line 35, Claim 56:

After "a controller, including at least one"
Delete "o" and
Insert – of --.

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Column 8, Lines 53-54, Claim 56:

After "with the at least one other vehicle, relative"
Insert – to --.

Column 8, Line 64, Claim 57:

After "at least one of the first cluster "
Insert – or the --.

Column 9, Line 2, Claim 57:

After "based at least on "
Delete "art" and
Insert – part --.

Column 9, Line 23, Claim 59:

After "the known light"
Delete "aiming" and
Insert – aimings --.

Column 9, Lines 23-24, Claim 59:

After "with the first cluster is based at least"
Delete "on" and
Insert – in --.

Column 10, Lines 14-15, Claim 64:

After "having light associated"
Delete "there" and
Insert – therewith --.

Column 10, Lines 40-41, Claim 65:

After "change of at least one LED"
Insert – of the --.

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Column 10, Line 43, Claim 65:

After "and at least one of"
Delete "he" and
Insert –the --.

Column 10, Lines 62-63, Claim 67:

After "or a change of at least one LED of the respective"
Delete "duster" and
Insert – cluster --.

Column 11, Lines 6-7, Claim 67:

After "the memory further stores instructions that, when executed"
Insert – by --.

Column 12, Lines 15-16, Claim 73:

After "in at least one of color or intensity"
Insert – or --.

Column 12, Lines 27-29, Claim 74:

After "by the one or more processors of the controller, enable the controller to:"
Delete "identity" and
Insert – identify --.

Column 12, Lines 30-31, Claim 74:

After "a road on which the motor vehicle is traveling; and"
Delete "accommodated" and
Insert – accommodate --.

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Column 12, Line 37, Claim 75:

After "cluster to a non-emitting"
Delete "state" and
Insert – state; --.

Column 13, Lines 13-14, Claim 80:

After "one or more sensors, including one or more cameras,"
Delete "place" and
Insert – placed --.

Column 13, Line 14, Claim 80:

After "on the structure"
Delete "or" and
Insert – for --.

Column 13, Line 31-32 Claim 80:

After "associated with the target as the target"
Delete "move" and
Insert – moves --.

Column 14, Lines 2-3, Claim 81:

After "a change to intensity or color or a"
Delete "chance" and
Insert – change --.

Column 14, Line 38, Claim 84:

After "The illuminating device"
Delete "or" and
Insert – of --.

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Electronic Acknowledgement Receipt

EFS ID:	46602165
Application Number:	90014815
International Application Number:	
Confirmation Number:	6654
Title of Invention:	Detector Controlled Illuminating System
First Named Inventor/Applicant Name:	9955551B2
Customer Number:	22045
Filer:	Sangeeta G Shah/Fiona Archer
Filer Authorized By:	Sangeeta G Shah
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Receipt Date:	13-SEP-2022
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Time Stamp:	11:04:00
Application Type:	Reexam (Patent Owner)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	TRCH0102RX_Request_for_Certificate_of_Correction.PDF	180256 4fd833b261175544096214dde6316b40a52d190f8	no	11

Warnings:

Information:					
2	Request for Certificate of Correction	TRCH0102RX_Certificate_of_Correction.PDF	198597 8afe780d29c6a923d3d539458ca8dae0726de680	no	8
Warnings:					
Information:					
			Total Files Size (in bytes):	378853	

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.