

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HOME DEPOT U.S.A. INC.,
Petitioner,

v.

LYNK LABS, INC.,
Patent Owner.

Case PGR2023-00016
Patent 11,297,705

EXHIBIT 2045

DECLARATION OF ALFRED DUCHARME, PH.D.

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I. INTRODUCTION

1. My name is Dr. Alfred D. Ducharme. I have been retained as an expert witness to provide my independent opinion in regards with matters at issue in the *inter partes* review of U.S. 11,297,705 (“the ’705 Patent”) in the PGR2023-00016 proceeding. I have been retained by Lynk Labs, Inc. (“Lynk”), the Patent Owner, in the above proceedings. Petitioner in this case is Home Depot U.S.A., Inc. (“Home Depot.”).

2. Unless otherwise noted, the statements made herein are based on my personal knowledge, and if called to testify about this declaration, I could and would do so competently and truthfully.

3. A detailed record of my professional qualifications including cases in which I was an expert is being submitted herewith as Exhibit 2046 and is summarized in Section II, *infra*.

4. I am not a legal expert and offer no opinions on the law. However, I have been informed by counsel of the various legal standards that apply, and I have applied those standards in arriving at my conclusions.

5. For my work in connection with this case, I am being compensated at my standard consulting rate of \$440 per hour. My compensation does not depend on my testimony rendered or on the outcome of this case.

6. The opinions I set forth herein are my own and are based on my education, experience, training, and skill I have accumulated.

II. QUALIFICATIONS

7. Attached as Exhibit 2046 is a copy of my c.v., list of publications, and a list of cases in which, during the previous 4 years, I have testified as an expert at trial and by deposition.

8. As indicated on my c.v., I have three degrees in electrical engineering: a B.S., M.S., and Ph.D.

9. My experience over the past 20 years includes designing building, and testing LED products. I have significant experience designing LED lighting systems, power electronics, and software/firmware for a variety of embedded systems, including solid-state lighting systems.

10. I have practical and academic experience in optical and electrical devices that include functions for display of aesthetic lighting features. I have a doctoral degree in Electrical Engineering with a specialization in Photonics, which is the study of the generation, manipulation, and detection of light. At the University of Central Florida, I served as Assistant Professor of College of Engineering and Computer Science and College of Optics and Photonics (joint appointment), as Assistant Dean and Associate Professor for the College of Engineering and Computer Science, and as Chairman for the Department of Engineering Technology

for the College of Engineering and Computer Science from 2002 – 2013. I created the University of Central Florida’s undergraduate degree program in Photonics, and I have taught a variety of university level courses in photonics and electronics.

11. Before joining the University of Central Florida, I was an engineer in the optical industry for eight years and worked for three high technology companies.

I am an inventor listed in the following twenty-five United States patents:

10,365,663, 10,054,943, 8,142,051, 7,959,320, 7,659,674, 7,572,028, 7,520,634, 7,387,405, 7,350,936, 7,255,457, 7,242,152, 7,286,003, 7,161,556, 7,135,824, 7,132,785, 7,088,040, 7,064,498, 7,014,336, 6,975,079, 6,956,500, 6,897,624, 6,608,453, 6,100,640, 6,049,297, and 5,997,155. All but five of these patents involve lighting. The patents span the years of 1999 to 2019.

12. From 1999 to 2002, I worked as an engineer at Color Kinetics Incorporated (“Color Kinetics”), a lighting company that is now part of Signify (previously Philips Solid-State Lighting Solutions). Color Kinetics was well known as a center of LED innovation during this time. My work at Color Kinetics resulted in, among other things, my being a coinventor on a number of patents in the Color Kinetics patent portfolio, now owned by Signify.

13. I also am experienced in consumer product design. These products include “light engines” used inside existing luminaires as well as LED-based luminaires.

14. At Color Kinetics, I led the LED Research Group. We performed all optical design needs for all product lines, as well as creating and designing all new commercial products. During the development of these products, I consulted with persons skilled in product design. I exchanged input with those having skills with LED packaging, encapsulation, environmental ingress, and other topics concerning the protection of outdoor and indoor lighting products.

15. I also wrote and won a DOE Phase I SBIR proposal for the development of a system to project uniform illumination for the performance evaluation of photovoltaic cells. This successful project led to a commercial product for testing of photovoltaic cells. Specifically, the illumination optics that I designed for this product were based on a novel non-imaging compound parabolic concentrator.

16. In 2010, I co-founded Hoverfly Technologies, Inc. Hoverfly currently develops and manufactures aerial drone systems for commercial, educational, industrial, and personal use.

17. At Hoverfly, I have managed a team of engineers in designing at least twenty (20) products. The development products have included mechanical, electrical, and aesthetic considerations. I supervise employees with experience in design, who were assigned tasks related to the mechanical and electrical aspects of the aerial vehicles that Hoverfly develops.

18. The Hoverfly aircraft products use LEDs, Illumination accessories, and thermal and visible cameras. Each craft has as many as 30 individually controlled LEDs. Most of these are used as display light sources without consideration of illumination optics. An illumination accessory was designed by me to provide illumination from an aerial vehicle. This optic had the ability to provide 10 footcandle illumination at an altitude of 100 feet with a 50 foot diameter footprint. This application is similar to LED based lighting products because it includes an LED light source, power electronics, means to protect the lamp and distribute the light, and mechanical parts to position and mount the light fixture to the aircraft.

19. As Chief Technology Officer of Hoverfly, I was responsible for all electronic sub-systems of our products. This included the design of analog, digital, and microprocessor based printed circuit boards. Development included circuit simulation, firmware development, printed circuit board layout, and testing. These designs included 90-240 VAC mains power electronics, AC/DC rectification, DC-to-DC conversion, power distribution, power factor correction, and all other associated aspects of power delivery for our systems. These systems are typically used by the military and have gone through rigorous test and fielding in harsh conditions.

III. BASES OF OPINIONS

20. In the course of conducting my analysis and forming my opinions, I have reviewed the exhibits submitted to date in this IPR, as well as the Petition, Preliminary Response and Institution Decision.

IV. APPLICABLE LEGAL STANDARDS

A. Ordinary Skill in the Art

21. My opinions in this declaration are based on the understandings of a person of ordinary skill in the art, which I understand is sometimes referred to as an “ordinary artisan” or by the acronym “POSITA” (person of ordinary skill in the art), as of the time of the invention. For purposes of this Declaration, I have been instructed to use May 28, 2010 as the time of invention. I understand that the person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. By “relevant,” I mean relevant to the challenged claims of the ’705 Patent.

22. I understand that, in assessing the level of skill of a person of ordinary skill in the art, one should consider the type of problems encountered in the art, the prior solutions to those problems found in the prior art references, the rapidity with which innovations are made, the sophistication of the technology, the level of education of active workers in the field, and my own experience working with those of skill in the art at the time of the invention.

23. I was at the time of invention, and am currently, one of more than ordinary skill in the art through my education and research experience. As of the date of the invention, I am very familiar with the types of problems encountered in LED lighting systems, the types of prior art solutions described in prior art references, and the rapidity at which innovations are made. Indeed, I am very familiar with people having this level of skill in the area of LED lighting control systems. At the time of the invention, and since that time, I have been involved in the design and development of LEDs and LED lighting systems and in that capacity have worked with and managed teams of numerous individuals that would qualify as a POSITA.

B. Claim Construction

24. I understand that claims of the patent-at-issue in this IPR are generally interpreted according to their ordinary and customary meaning taking into consideration the so-called “intrinsic evidence” of the patent consisting of (1) the claim language; (2) the specification; and (3) the prosecution history.

25. I understand that claim terms may be explicitly defined in the patent specification, or they may be implicitly defined through consistent usage in the specification. I also understand that the scope of claim terms may be limited by statements in the specification or prosecution history where the applicant clearly disavows or disclaims subject matter.

C. Obviousness (35 U.S.C. § 103)

26. I have been informed that a patent may be invalid if the claimed invention would have been obvious at the time the invention was made to a person having ordinary skill in the art. I have been informed that the following factors must be evaluated to determine whether Petitioner has met its burden of proof that a claimed invention is obvious:

1. The scope and content of the prior art relied upon by Petitioner;
2. The difference or differences, if any, between each claim of the patent and the prior art;
3. The level of ordinary skill in the art at the time the invention of the patent was made; and
4. Any objective indicia of non-obviousness, including, for example:
 - (1) commercial success of an embodiment; (2) a long-felt need; (3) skepticism; (4) failure by others to find the solution provided by the claimed invention; (5) copying by others of the subject matter of the claim invention; (6) unexpected results of the claimed invention; (7) acceptance of others and industry praise; and (8) licensing of the patents.

27. I have been informed that a claim is not proved obvious merely by demonstrating that each of the elements was independently known in the prior art. I have been informed that many, if not all, inventions rely on building blocks already

known, and claimed inventions almost of necessity will likely be combinations of what is already known.

28. I have been informed that a combination of prior art references must disclose, teach or suggest all the recited limitations of the claim for the invention to be found obvious.

29. I have been informed that it is important in the obviousness inquiry to identify whether a reason existed at the time of the invention that would have motivated a person of ordinary skill in the art in the relevant field to combine or modify the prior art references in the manner proposed by the Petitioner to arrive at the claimed invention. Put another way, a finding of obviousness should be supported by an apparent reason to combine or modify the prior art references as proposed by the Petitioner.

30. I have been informed that it is important in the obviousness inquiry that it is understood how the combination of references is supposed to work. An explanation of the operation of the combined references is often a prerequisite to showing that a person of ordinary skill in the art would have been motivated to make the proposed combination and would have had a reasonable expectation of success.

31. I have been informed that a finding of obviousness “requires the additional showing that a person of ordinary skill 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.” *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). In addition, I have been informed that a person of ordinary skill in the art should have had a reasonable expectation of success in combining the references as proposed.

32. In assessing obviousness, I have been instructed to consider both the ordinary creativity and common sense of the person of ordinary skill in the art. I also understand that it is impermissible for common sense to be applied to fill gaps in prior art that fails to teach or suggest a limitation of the claim. I also understand that the obviousness inquiry should guard against hindsight bias or hindsight reconstruction where after-the-fact reasoning is applied to combine prior art elements using the claimed invention as a template, without establishing that, as of the date of the invention, there exists a motivation to combine or apparent reason to combine the prior art as proposed.

33. In assessing obviousness, I have been instructed that, to qualify as proper prior art for an obviousness analysis, a reference must qualify as analogous art. I have been informed that a reference qualifies as analogous art with respect to the claims if it is either: (1) from the same field or endeavor as the patent; or (2) the reference is reasonably pertinent to the particular problem addressed by the invention. I have also been informed that for a reference to be reasonably pertinent,

it must logically have commended itself during the ordinary course of development to an inventor's attention in considering his problem.

34. In assessing obviousness, I have also been instructed that, as noted above, secondary considerations can often be probative evidence of non-obviousness and can serve to avoid hindsight bias. I have been instructed that secondary considerations can be sufficient to overcome a prima facie case of obviousness. I have been instructed that Patent Owner can show non-obviousness if: (1) the industry praised their work; (2) their design was copied by others; (3) their design achieved a high level of commercial success; or (4) their invention had unexpected beneficial results, for example.

V. OVERVIEW OF THE '705 PATENT AND THE STATE OF THE ART

35. For clarity to the reader, my citations will generally adhere to these formats:

- Petitions and other papers filed by the parties. Example: Pet., 10, 12 refers to the Petition at pages 10 and 12.
- Patents will be cited by their exhibit number, bates stamped page and specific column and line numbers when feasible. Example: Ex. 1007 [Mueller] 1:10-12 refers to the Mueller patent at Col. 1, lines 10-12. Ex. 1008 (1:10-12) refers to same passage of Mueller.

- Articles and other publications will be cited by their exhibit number and bates stamped page and their original page number when feasible.

A. Technical Background of the '705 Patent

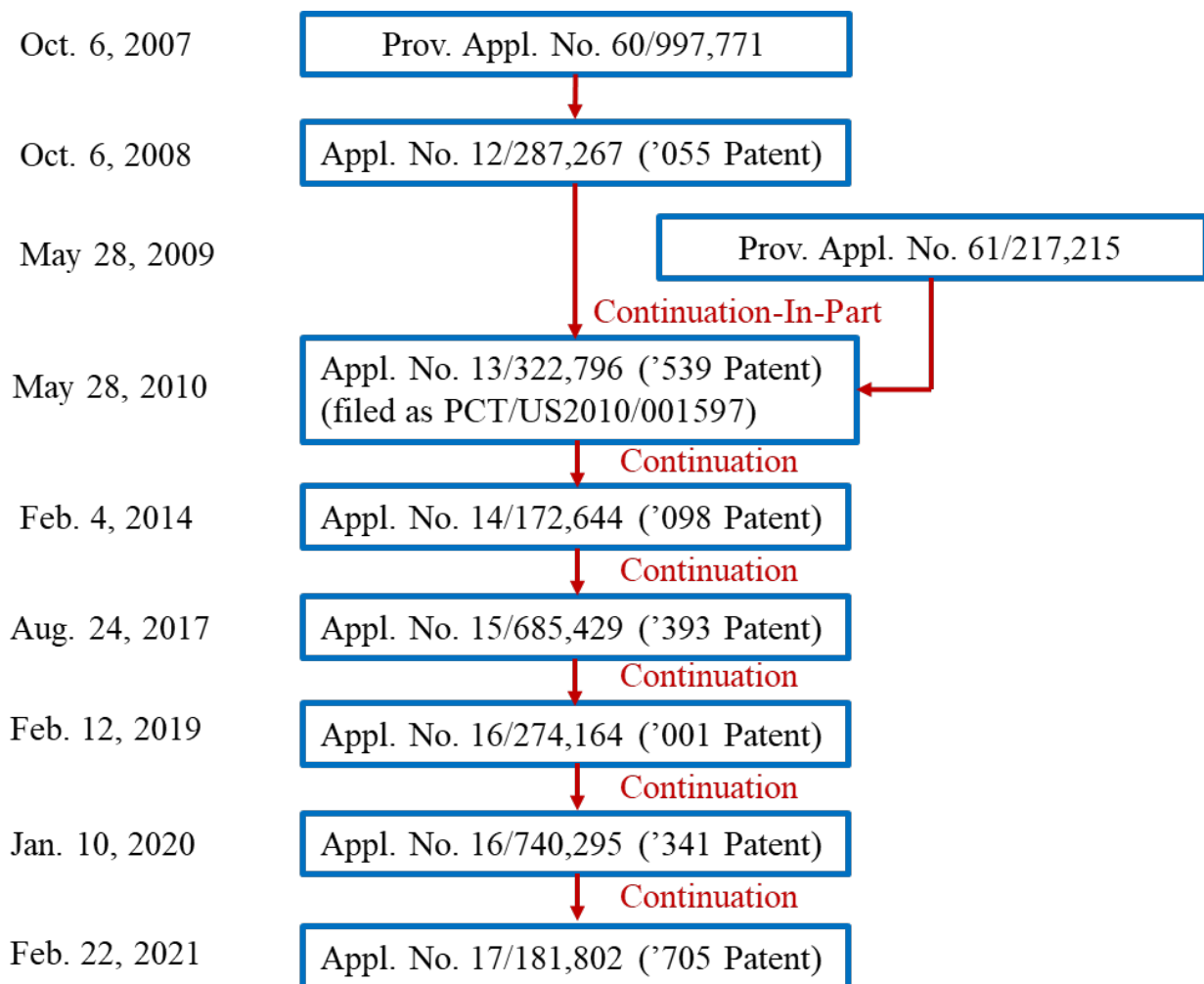
36. The general field of the '705 Patent is LED lighting devices, and in particular a multi-brightness LED lighting device having at least two LED circuits. Ex. 1001 ['705 Patent], Abstract. The '705 Patent additionally describes "The present invention relates to multiple voltage level and multiple brightness level light emitting diode circuits, single chips, packages and lamps 'devices' for direct AC voltage power source operation, bridge rectified AC voltage power source operation or constant DC voltage power source operation." *Id.*, 1:43-48.

37. A POSITA would understand that an LED circuit would necessarily contain one or more LED packages and that an LED package would contain one or more LED chips connected in a series, parallel or series/parallel configuration. As an example, the Samsung LH502C LED package has a typical forward voltage of 6.1 V (range of 5.9 to 6.3 V). Ex 2012, [Samsung LH502C], 3. A POSITA would know that the typical forward voltage of a GaN based LED would be in the range of about 2.8 to about 3.1 volts. The forward voltage of the Samsung LH502C package therefore has at least two LED chips connected in series to yield a package with a typical forward voltage of 6.1 V.

B. Prosecution History

38. The '705 Patent traces its priority back through continuation applications to the Pre-AIA '597 PCT, filed on May 28, 2010. Ex. 1001 ['705 Patent], 1:5-24. Each of these continuation applications in turn incorporates by reference every prior patent and application in the chain. Ex. 1009 ['429 Application], ¶[0001]; Ex. 1010 ['644 Application], ¶[0001]; Ex. 1016 ['796 Application], ¶[0001]; Ex. 1017 ['267 Application], ¶[0001]; Ex. 1018 ['597 PCT], [Para 1]; Ex. 1019 ['164 Application], ¶[0001]; Ex. 2001 ['295 Application], [Para 1]. Thus, there appears to be continuity of disclosure between each application in the chain dating back to the '597 PCT, filed on May 28, 2010.

39. A chart summarizing the priority chain is shown below.



40. While the specification of the grandparent '164 Application was amended on July 5, 2019 to include several paragraphs from the '215 Provisional Application (Exs. 2002 ['001 Patent 6-13-2019 Response], 8-9; 2003 ['001 Patent 6-13-2019 Amendments To Specification], 10-11; 2004 ['001 Patent 7-5-2019 Remarks], 7-8; 2005 ['001 Patent 7-5-2019 Amendments To Specification]), those amendments simply copied paragraphs already present in the '215 Provisional (and expressly incorporated by reference into the '164 Application) into the body of the '164 Application specification. *Id.* Ex. 1001 ['705 Patent], 1:5-23. The amendments

therefore do not appear to add anything that was not already incorporated by reference into the '705 Patent and each of its ancestor applications back to at least the '597 PCT. In other words, showing support for the claims in the '597 PCT (and the '215, '267 and '771 applications it incorporates by reference) correspondingly shows support in the '705 Patent.

C. Level of Ordinary Skill

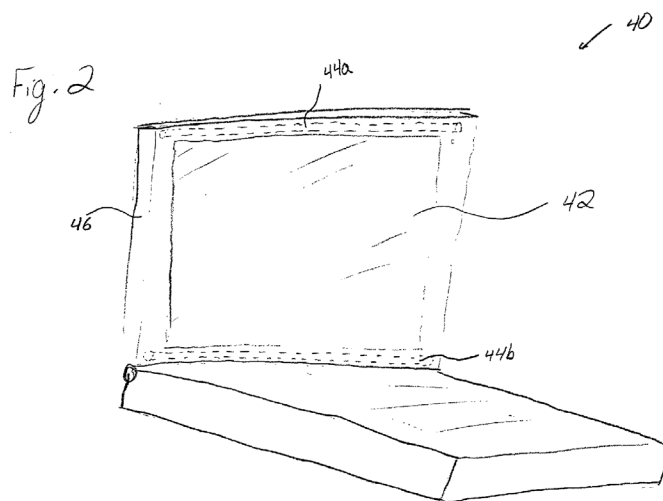
41. The Petition and Petitioner's expert (Dr. Neikirk) have asserted that a person of ordinary skill in the art as of the time of the '705 Patent would have had a bachelor's degree in electrical engineering, or similar technical field, with two years of relevant experience in the field of design and/or development of LEDs and circuits in the context of lighting control systems, and that an increase in experience could compensate for less education. Pet., 10-11, EX1002 [Neikirk Decl.], ¶ 46. For purposes of institution, the Institution Decision adopted Petitioner's definition. Paper 8, 11. I do not dispute that definition for purposes of this declaration.

D. Prior Art

1. Bruning (Ex. 1004)

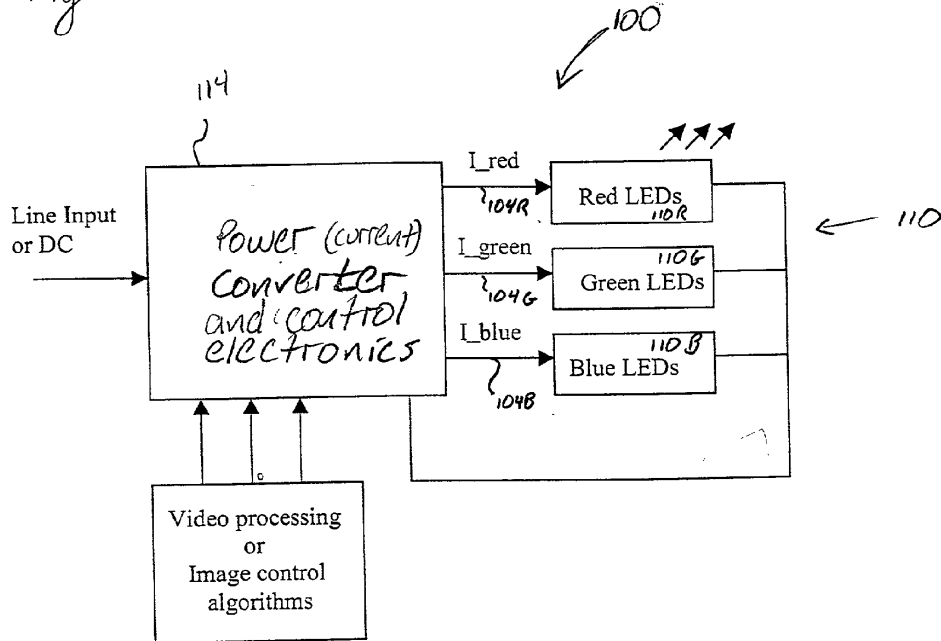
42. U.S. Pat. App. Pub. No. 2002/0070914 ("Bruning") was published June 13, 2002. Bruning teaches a back light for LCD displays. Ex. 1004 [Bruning], ¶[0002] ("A back light is typically used to illuminate an LCD panel for information display."). Bruning further teaches that "[t]he liquid crystal itself does not generate

light, but instead either passes or impedes the passage of light as described above. Thus, a ‘back light’ is typically provided for the LCD, which provides light to the pixels of the LCD.” Ex. 1004 [Bruning], ¶[0004]. Fig. 2 of Bruning (below) illustrates a display of the sort that is backlit in Bruning.



43. In certain embodiments, Bruning’s back light is lit by an LED array 110 composed of red, green, and blue LEDs, as shown in Bruning Fig. 3. These LED arrays “may be controlled by power converter so that each sub-array 110R, 110G, 110B contributes the requisite amount of red, green and blue light so that LED array 110 outputs controlled white light.” Ex. 1004 [Bruning], ¶[0026].

Fig. 3



44. Bruning Fig. 4 (below) shows more detail regarding the LEDs and drivers, which include a transformer and other components of the power converter. As shown, the transformer consists of primary winding N1 and secondary windings N2-N4. Each secondary winding is coupled to an LED array (red, green, or blue) by way of switches Q5, Q3, and Q4. The duty cycles of these switches (which is “on the order of microseconds”) are altered to vary the current reaching the LED arrays, and thereby alter the color and/or intensity of the white light provided to the back light. Ex. 1004 [Bruning], ¶¶[0043]-[0045].

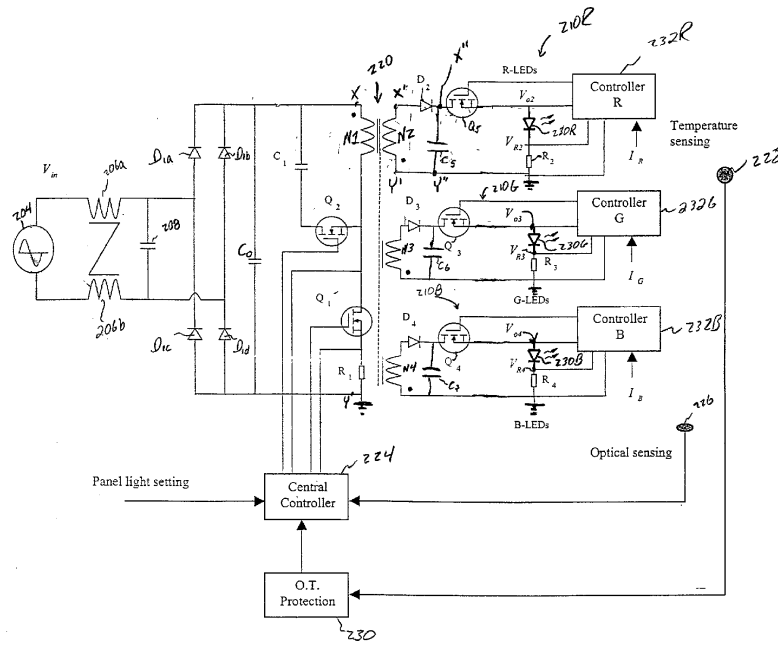


Fig. 4

2. Lee (Ex. 1031)

45. U.S. Pat. App. Pub. No. 2006/0022999 (“Lee”) was published February 2, 2006. Lee is directed to setting the color point of an LED light. Ex1031 [Lee], Methods and Apparatus for Setting the Color Point of an LED Light Source.

46. Lee teaches the use of a plurality of LEDs to create a light source with a specified spectral balance (e.g. white light source). The patent includes a method for measuring the color output of the light (spectral content) and make adjustments to the LED control to adjust the color point (combined color). This is primarily for applications in liquid crystal display (LCD) display backlighting and could also apply to decorative lighting.

47. Lee teaches the use of a color point prediction routine if active, the controller predicts pulse width modulated signals for LEDs of the light Source and maintains these signals for a predetermined period. If inactive, the controller receives tristimulus values representing the color of light produced by the LED light source, compares these values to RGB tristimulus values, and generates pulse width modulated signals.

48. A method comprises receiving a user-selected color point, deriving red, green, and blue (RGB) tristimulus values for the user-selected color point, determining whether the user-selected color point is outside a color selection range of the LED light source and, if so, setting an error flag. In response to the RGB tristimulus values, generating pulse width modulated signals for a plurality of LED drivers for the LED light source.

49. In another embodiment, the controller is configured to receive tristimulus values representing a color of light produced by the LED light source, compare the received values to desired values, generate pulse width modulated signals for the LEDs, and repeat these actions a predetermined number of times. An error flag is set if the user-selected color point has not been achieved by the LED light source.

50. The controller is configured to derive RGB tristimulus values for the user-selected color point, determine whether the user-selected color point is outside

the color selection range of the LED light source, and, if so, set an error flag. In response to the RGB tristimulus values, the controller generates drive signals for a plurality of LEDs forming the LED light source.

51. The LED brightness in the system is controlled using pulse width modulated signals generated in response to derived RGB tristimulus values for a user-selected color point. The controller receives tristimulus values representing the color of light produced by the LED light source, compares these to the desired RGB tristimulus values, and adjusts the pulse width modulated signals accordingly.

3. Evanicky (Ex. 1013)

52. U.S. Pat. App. Pub. No. 2002/0163529 (“Evanicky”) was published November 7, 2002. Evanicky is directed to color balancing within an LCD display unit. EX1013 [Evanicky], Multiple Light Source Color Balancing System within a Liquid Crystal Flat Panel Display.

53. The patent describes a system that adjusts the brightness of different light sources to match a desired LCD color temperature. The system ensures that the brightness of the LCD does not fall below a certain threshold and that the color temperature remains close to a specific curve in the chromaticity diagram.

54. The system uses multiple light sources with different color temperatures. These light sources are optically coupled to planar light pipes that provide backlight to the LCD layer. In one embodiment, there are two light pipes

with four light sources, two for each pipe. The brightness of these sources can be adjusted to achieve color balancing. Another embodiment uses two light sources of the same color temperature with one light pipe and a third variable intensity light source with a second light pipe. Yet another embodiment has a single light pipe with four light sources.

55. The patent details a color balancing system for flat panel LCDs that adjusts the brightness of multiple light sources, specifically "blue" and "red" sources, to achieve desired color temperatures. Users can modify the color balance using a slider mechanism, with some embodiments providing real-time feedback via a chromaticity measuring device. The system ensures consistent color representation by holding the color temperature close to the black body curve of the CIE chromaticity diagram, while maintaining a minimum brightness threshold, such as 70% of the maximum output.

4. Doheny (Ex. 1011)

56. U.S. Pat. App. Pub. No. 2018/0035510 ("Doheny") was published February 1, 2018 with a provisional application filed February 19, 2016. Doheny is directed to a luminaire with a lumen control module that can be configured to emit different brightness levels of the luminaire. EX1011 [Doheny], Abstract.

57. The patent describes a luminaire, which is a type of lighting system. This luminaire includes a power supply that receives AC mains power from a source

and delivers intermediate power. It also features a lumen control module connected to the power supply. This module receives the intermediate power and comprises at least one switch with multiple positions and several resistors connected to this switch. Each switch position corresponds to a resistance of the resistors, translating the received intermediate power to a current level based on this resistance. The luminaire also has at least one light source connected to the lumen control module. This light source emits light based on the current level it receives from the lumen control module.

58. In some embodiments, the luminaire housing is circular, designed for extending around an aperture in a ceiling. It may have a wiring port on its side and a light-emitting aperture where a substrate is placed. Some versions also include a lens for refracting light emitted by the light-emitting diodes (LEDs) and a reflector placed between the lens and the LEDs to reflect light.

59. The patent introduces a lighting system with a unique mechanism for controlling the brightness of its light sources. The system comprises a lumen control module that determines the amount of power, specifically the current, delivered to the light sources, thereby directly influencing their lumen output. This process is sometimes referred to as "current steering" or "current routing." The control module can include various components such as a switch and multiple resistors. The switch, in conjunction with the resistors, can be set in different configurations to achieve

desired current levels. By adjusting these configurations, the brightness or lumen output of the light sources can be modulated. This design offers flexibility and precision in controlling the brightness of the light sources in the luminaire.

5. Van Winkle (Ex. 1012)

60. U.S. Pat. App. Pub. No. 2018/0206305 (“Van Winkle”) was published July 19, 2018 with a provisional application filed on January 13, 2017. Van Winkle is directed to an LED light fixture that allows for manual control of color temperature. EX1012 [Van Winkle], Title, Abstract.

61. The patent introduces an LED light module with a distinct design and assembly. Central to this module is a heat sink, designed to absorb the heat generated by the LED light sources. Inside this heat sink is a shade. Proximal to the closed end of the heat sink is a printed circuit board. The reflector, another component, acts as a liner for the shade and is attached to the heat sink using screws. Additionally, a diffuser is attached to the housing, enhancing the light’s distribution.

62. The patent teaches an LED fixture is the manually operable CCT (Correlated Color Temperature) switch assembly. This assembly incorporates a slide switch, empowering users to adjust the LED light's correlated color temperature. Such a feature offers versatility in lighting, allowing users to change the ambiance as desired.

63. The printed circuit board's design teaches two series of LEDs, organized in inner and outer imaginary rings. Each LED series has a distinct correlated color temperature. Their arrangement guarantees uniform illumination, enhancing the light quality. Moreover, the LED light fixture is designed for ceiling attachment, equipped with specific slots and holes for mounting screws. A notable design aspect is the concealment of the CCT switch within the LED light fixture's body.

64. The patent details a manually controllable LED light fixture that allows users to adjust the Correlated Color Temperature (CCT) of the emitted light. The LED light fixture incorporates various sets of LED light sources, each having a distinct CCT. Users can manually control the CCT through a switching assembly, which includes options like slide switches, toggle switches, rotary switches, and DIP switches, among others. This manual control enables the selective illumination of specific LED sets to emit light of the desired color temperature. For instance, the document mentions possible CCT values like 3000K (yellow light), 4000K (bright white light), and 5000K (daylight). The design ensures that users can easily access and operate the CCT switch to achieve the desired ambiance and lighting conditions.

VI. CLAIM CONSTRUCTION

A. Forward voltage

1. Proper construction for “forward voltage”

65. In my opinion, the term “forward voltage” in the ’705 Patent should be construed as the operating voltage for the claimed LED circuit.

66. The term “forward voltage” in the ’705 Patent should be construed as the operating voltage for the claimed LED circuit.

67. The term “forward voltage” is present in dependent claims 3, 10, and 17. Ex. 1001 [’705 Patent], claims 3, 10 and 17. Each of these claims is substantially similar. Claim 3 is representative and is reproduced below:

3. The LED lighting system of claim 1, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.

Id.

68. Per the express language of claim 3, a forward voltage is the voltage “provide[d]” to the claimed “operating LED circuit.” Ex. 1001 [’705 Patent], claim 3. The term “operating” voltage for the LED circuit clarifies that the claim requires voltage in a range that will cause the LED circuit to “operat[e]”—that is, illuminate in the manner intended.

69. The claims also require “forward voltage” to be a range of voltages. Ex. 1001 [’705 Patent], claims 1 (“switching a voltage level input” to the operating LED

circuit), 3 (“the switching of the switch provides at least two different DC forward voltages.”). Consistent with PO’s construction, the “operating voltage” can be a range of voltages.

70. The specification supports this construction. The title of the ’705 Patent is “multi-voltage and multi-brightness LED lighting devices and methods of using same.” Ex. 1001, [’705 Patent], Title. The specification repeatedly indicates the forward voltages are determined based on the desired operating voltage. 1:41-43 (“The present invention generally relates to light emitting diodes (‘LEDs’) for multi-voltage and/or multi-brightness level operation.”), 1:65-2:6 (“Therefore, it would be advantageous to have a single chip LED or multi-chip single LED packages that could be easily configured to operate at multiple voltages...”). 3:15-18 (“This invention comprises circuits and devices that can be driven with more than one AC or DC forward voltage ‘multi-voltage’ [] based on a selectable desired operating voltage.”). Thus, the ’705 Patent comprises multiple voltages to LED lighting devices to change the brightness of the LED circuit.

71. Likewise, the specification discusses the fact that the forward voltage “drives” the LED circuit. *See, e.g.*, Ex. 1001 [’705 Patent], 3:15-17 (“This invention comprises circuits and devices that can be driven with more than one AC or DC forward voltage ‘multi-voltage’ at 6V or greater”); 4:9-11 (“each single voltage AC LED circuit is designed to be driven with a predetermined forward voltage...”);

4:42-44 (“each multi-voltage AC or DC LED device would be able to be driven with at least two different AC or DC forward voltages...”); 5:47-54 (referencing a first and second “forward voltage drive level.”). The term “drives” underscores that the forward voltage must be in the range sufficient to operate the LED circuit—that is, to turn on the LED circuit at the desired light intensity. If the forward voltage was not within the operating range, it would not drive the LED circuit.

72. Additionally, the ’705 Patent at 5:5-15, 5:65-70, and 6:25-30 further bolster the position that “forward voltage” is the operating voltage of the LED circuit. EX1001 [’705 Patent], 5:5-15, 5:65-70, and 6:25-30. From these excerpts, it is clear that the “forward voltage” refers to the voltage required to drive the LED circuits, and the patent discusses methods and configurations for achieving different forward voltage drive levels by connecting LED circuits in series or parallel. The patent also mentions specific forward voltage values such as 6 VAC, 12 VAC, 24 VAC, and 120 VAC, among others.

73. Accordingly, the term “forward voltage” in the ’705 Patent should be construed as the operating voltage for the claimed LED circuit.

2. Petitioner’s constructions are incorrect

74. Petitioner argues for a construction of “forward voltage” to mean either “the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs.” (Pet., 24)

or, alternatively, as “a voltage in a diode’s forward direction.” Pet., 25. In my opinion, both constructions are incorrect.

a. Petitioner’s first construction is incorrect

75. Petitioner’s first proposed construction is “the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs.” Pet., 24. Petitioner uses this proposed construction to further argue that it means the forward voltage in claims 3, 10, and 17 must be a single, predetermined voltage. Pet. 28-30. In my opinion, this is incorrect.

i. Petitioner’s construction directly contradicts the claims and specification of the ’705 Patent

76. Petitioner’s construction contradicts the claims and specification. Claims 3, 10, and 17 *require “two different” forward voltages to an “operating LED circuit.”*

77. Petitioner’s construction also reads out embodiments in the specification expressly disclosing multi-voltage circuits. *See, e.g.*, Ex. 1001 [’705 Patent], 3:15-17 (“This invention comprises circuits ... driven with more than one AC or DC forward voltage ‘multi-voltage’ ...”), 6:7-9 (“According to another aspect of the invention, a multi-voltage ... LED circuit...”), 6:50-56 (“multiple individual discrete LED chips are used to form at least one multivoltage ... LED circuit. ... Each multi-voltage ... LED circuit ... comprises at least two single voltage AC LED

circuits.”). Further, interpreting forward voltage to be one fixed minimum voltage would be contrary to the purpose of the ’705 Patent (which is to provide multiple voltage levels and multiple brightness levels to LED circuits) and excludes numerous embodiments of the ’705 Patent discussed above, including the embodiments covering the stated purpose of the patent. *See, e.g.*, Ex. 1001 [’705 Patent], Title, Abstract, 3:15-17, 4:40-43, 5:3-6, 5:47-54.

78. Petitioner argues its construction is “consistent with the specification of the 705 patent, which repeatedly states that each *individual* LED circuit has a ‘single’ and ‘predetermined’ ‘forward voltage’” (Pet, 25). That argument mischaracterizes the intrinsic record. While there are embodiments in the specification that disclose LED circuits with a single voltage, there are numerous embodiments that disclose multi-voltage LED circuits and the express field of the invention “specifically relates to multiple voltage level ... light emitting diode circuits.” Ex. 1001 [’705 Patent], 3:43-45. In my opinion, any construction interpreted to limit claims 3, 10, and 17 to a single predetermined voltage reads out disclosed embodiments and contradicts the claims themselves, the specification, and the stated purpose of the ’705 Patent.

79. Given the foregoing, a POSITA reading the specification of the ’705 Patent would understand that multiple voltage level LED circuits (i.e., LED circuits with multiple forward voltages) are one of the most important features of the ’705

Patent. The idea of using different forward voltages to drive an LED circuit is an interesting aspect of the '705 Patent as more typically LEDs are discussed as being driven by current levels. *See, e.g.*, EX2051 [All About Circuits], 6-7 (discussing the diode equation in terms of the diode current). However, either approach is completely valid and understood by a POSITA.

80. Further, the '705 Patent discusses that two LED circuits may be configured to operate at a first forward voltage level when connected in parallel and a second forward voltage level when connected in series. *See, e.g.*, Ex. 1001 ['705 Patent], 4:16-22 (“According to another aspect of the invention, each multi-voltage AC LED device would be able to be driven with at least two different AC forward voltages resulting in a first forward voltage drive level by electrically connecting the two single voltage AC LED circuits in parallel and a second forward voltage drive level by electrically connecting the at least two single voltage AC LED circuits in series.”). Thus, the '705 Patent teaches combining multiple single voltage LED circuits in parallel or series to create a multi-voltage LED circuit. A POSITA would understand that a multi-voltage LED circuit is still an “LED circuit” as required by the claims.

81. The extrinsic record underscores that Petitioner’s proposed construction is incorrect. For example, LED datasheets are clear that the type of commercially available LEDs that the '705 Patent is directed to are not limited to a single

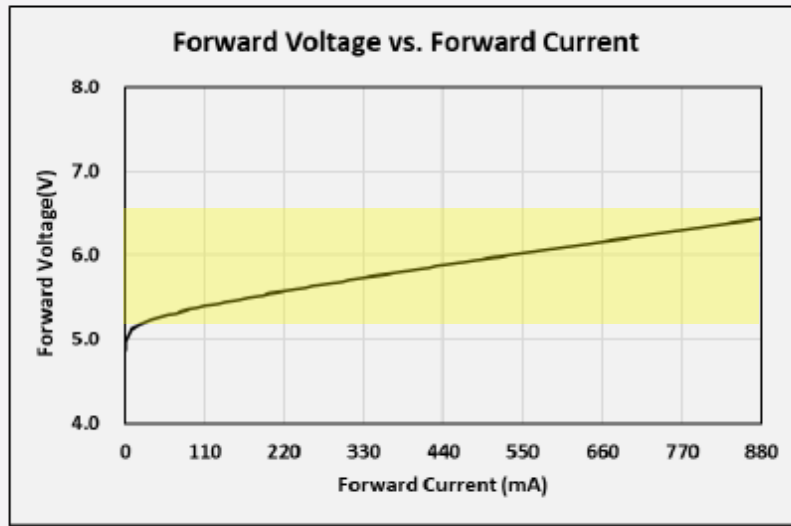
minimum voltage. Ex. 2036 [Samsung Datasheet] is a publicly available datasheet for a typical LED, Samsung High Power LED LH502C. Page 3 lists various electro-optical characteristics for the LED. Ex. 2036 [Samsung Datasheet], 3. One characteristic is “Forward Voltage V_F ”. *Id.* As can be seen below, the datasheet lists a “Min.” (the minimum, 5.9V.), a “Typ.” (typical forward voltage, 6.1V), and a “Max.” (maximum forward voltage, 6.3V). Thus, the Samsung datasheet recommends a range of forward voltages between 5.9 and 6.3V, not one single forward voltage and not just a minimum voltage.

b) Electro-optical Characteristics ($I_F = 640\text{ mA}$, $T_j = 25^\circ\text{C}$)

Item	Unit	Rank	Min.	Typ.	Max.
Forward Voltage (V_F)	V	YE	5.9	6.1	6.3

82. Similarly, page 10 of Ex. 2036 [Samsung Datasheet] (annotated below) displays various characteristic graphs for the LED. In the top left corner is a graph of forward voltage versus forward current. As can be seen from the graph, current flows from a forward voltage of around 5V to around 6.5 V. Ex. 2036 [Samsung Datasheet], 10. Again, this demonstrates to a POSITA that there is a range of potential forward voltages for the Samsung LED depending on the amount of current provided. *See, e.g.,* EX2047 [Neikirk Dep. Tr.], 79:24-80:5 (“[Petitioner’s construction] would be one value. A single voltage. This graph [in EX2036] illustrates that you can apply a whole range of voltages in the forward direction.”).

b) Forward Current Characteristics ($T_j = 25^\circ\text{C}$)



83. Other portions of the datasheet are clear that the amount of current determines the luminous flux (which determines the perceived brightness of the LED), for the LED. Thus, multiple voltages may be applied to the LED depending on the desired brightness of the LED during operation. When additional LEDs are added in series to the LED circuit (as taught in the '705 Patent), the forward voltage would necessarily change to account for the voltage drop of the additional LEDs.

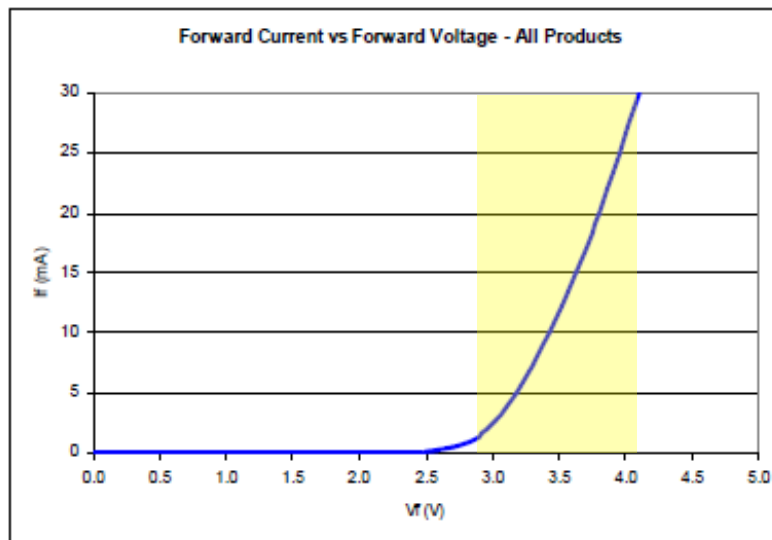
84. In another example, Ex. 2037 [Cree Datasheet] is a publicly available datasheet from the 2003 time frame for Cree MegaBright LEDs in the CxxxMB290-S0100 series. As shown at page 2 of Ex. 2037 [Cree Datasheet] (annotated below), the typical forward voltages for these LEDs can range from a minimum of 3.0V to a maximum of 3.8 or 4.0V. Once again, there is no single forward voltage associated with the LED, and the forward voltage is not limited to a minimum.

Typical Electrical/Optical Characteristics at $T_A = 25^\circ\text{C}$, $I_f = 20\text{mA}$ ^{Note 3}

Part Number	Forward Voltage (V_f V)			Reverse Current [$I(V_r=5V)$, μA]	Peak Wavelength (λ_p nm)	Full Width Half Max (λ_D nm)	Optical Rise Time (τ , ns)
	Min	Typ	Max	Max	Typ	Typ	Typ
C460MB290-S0100	3.0	3.5	3.8	10	458	26	30
C470 MB290-S0100	3.0	3.5	3.8	10	468	26	30
C505 MB290-S0100	3.0	3.8	4.0	10	502	30	30
C527 MB290-S0100	3.0	3.8	4.0	10	518	35	30

85. At page 4, the Cree datasheet also shows a characteristic curve of forward current versus forward voltage that is similar to the graph from the Samsung datasheet (albeit with the axes switched.) Ex. 2037 [Cree Datasheet], 4. As the Cree graph shows below, these LEDs have a forward voltage range of about 3.0V to 4.0 or 4.5V depending on the current. Ex. 2037 [Cree Datasheet], 4. Again, a POSITA would understand from this curve that the forward voltage is not limited to a single minimum voltage.

Characteristic Curves



86. Other contemporary LED datasheets had similar tables and disclosures showing ranges of forward voltages. *See, e.g.*, Exs. 2018 [Everlight Datasheet], 3-4; 2042 [Lite-On Datasheet], 4-5. These disclosures all demonstrate, consistent with a POSITA's knowledge, that the forward voltage even across a single LED does vary, creating a "multi-voltage" LED circuit as described in the claims. EX2051 [All About Circuits], 7 ("Just understand that the voltage dropped across a current-conducting diode does change with the amount of current going through it."). Consistent with the '705 Patent, a POSITA would understand that multi-voltage LED circuits can change forward voltages either by changing the current applied to the circuit, or by switching additional LEDs together in series. Thus, an LED's forward voltage is not limited to a single minimum forward voltage, as proposed by Petitioner.

ii. The Petition fails to show that prosecution history disclaimer applies

87. Petitioner's proposed construction is based on a statement from the file history of the grandparent '164 Application that "[t]he 'forward voltage' of an LED circuit, as recited in claim 1 [of the '164 Application], is the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs."). Pet., 24-25. Petitioner characterizes this out-of-context statement as an "express definition" of forward voltage as used in the claims of the '705 Patent in order to provide a limiting

construction. *Id.* Petitioner's proposed limiting construction is incorrect because it contradicts the claims, specification, and extrinsic evidence and is inconsistent with the prosecution history when placed in context.

88. Here, the claims and the specification of the '705 Patent contradict Petitioner's proposed construction. *See supra*, §VI.A.1. Counsel for Patent Owner has informed me that when a party argues a statement from the prosecution history by itself overrides the clear language of the claims and specification, that is called a prosecution history disclaimer argument. I further understand applying prosecution history disclaimer (and ignoring the plain language of the claims) requires a showing that the prosecution history contained a clear and unmistakable disavowal of the disputed claim scope.

89. In my opinion, Petitioner does meet this threshold because the statement is discussing different claim language in a different patent and different prior art in a different context. The context of the '001 Patent file history is clear that the Applicant did not intend to disclaim any interpretation of forward voltage other than a single minimum voltage. There, the Examiner had rejected claim 1 of the '164 Application over the prior art reference Colby. Ex. 1023, 9. In response, the Applicant amended claim 1 of the '164 Application to include the limitation "wherein the first operating LED circuit and the at least one additional LED circuit both have a forward voltage of 6V or greater." Ex. 1023, 9. This limitation is

missing from, and different than any limitation in, the '705 Patent. Ex. 1020 ['001 Patent], claims 1, 6, 11, 16.

90. Further, the issue being addressed in the '001 Patent file history was also different. There, the Applicant was arguing that the “recited forward voltage [of an LED] is different from the AC voltage provided by a typical wall outlet.” Ex. 1023 [June 13, 2019 Remarks], 9. The issue of whether forward voltage is different from AC mains is not relevant to the arguments in the record in this PGR.

91. The response also repeatedly qualified its statement to be limited to the then-current version of claim 1 of the '164 Application. *Id.* (“‘forward voltage’ of an LED circuit, as recited in claim 1 [of the '164 Application], is the minimum voltage ...”, “the recited forward voltage [in claim 1 of the '164 Application] is different from the AC voltage provided by a typical wall outlet.”). The pending claim language was “a forward voltage of 6V or greater” and the issue was whether an AC mains voltage (as taught in the Colby reference) constituted “a forward voltage of 6V or greater.” Ex. 1023 [June 13, 2019 Remarks], 9. No similar language is present in any of the claims of the '705 Patent. Thus, on its face, Applicant’s statement applies only to the then-pending version of claim 1 of the '164 Application, and only to the issue of whether AC mains is “a forward voltage of 6V or greater” as claimed in claim 1 of the '164 Patent. Because it is qualified and discussing a different issue,

a POSITA would not understand this statement to apply to the (different) claims of the '705 Patent.

92. Petitioner's interpretation is also contradicted by the website that the Applicant cited (www.baldengineer.com/led-basics.html) in support of the statement. Ex. 1023, 9; Ex. 2038 [Bald Engineer]. The website states "[t]he 'Forward Voltage' rating of a diode will determine the minimum voltage difference between the anode and cathode to allow current to flow." Read carefully, a POSITA would understand that the website is drawing a distinction between forward voltage and minimum voltage—the forward voltage rating determines, but is not necessarily equal to, the minimum voltage. *See, e.g.* Exs. 2052, 2053 (discussing forward voltage changes across a single LED). Further in the discussion, Bald Engineer cites to data sheets showing that LEDs have a forward voltage operating range, including a minimum and maximum voltage:

ITEMS	Symbol	Test condition	Min.	Typ.	Max.	Unit
Forward Voltage	V _f	I _f =20mA	1.8	---	2.2	V

93. Ex. 2038 [Bald Engineer], 4. *See id.*, 5 ("[t]he goal is to set the Forward Current for the LED at 20mA which means the LED will drop 1.8-2.2V."). This is inconsistent with Petitioner's proposed construction and consistent with PO's proposed construction because it shows a range of possible forward voltages for a

single exemplary LED (let alone an LED circuit composed of multiple LEDs in multiple configurations, as required by the claims). Thus, Bald Engineer contradicts Petitioner's interpretation of the '001 file history.

94. The statement Petitioner relies upon for its construction is expressly limited to claim 1 of the '164 Application, relates to different claims (requiring LED circuits that have “a forward voltage of 6V or greater”) in a different patent in the context of prior art (Colby) that is not at issue here. See, e.g., Ex. 1023 at 9. Further, the issue being discussed—whether AC mains is a forward voltage—is different than whether multi-voltage LED circuits can have more than one forward voltage. As discussed above, the claims and specification of the '705 Patent repeatedly and unambiguously require that LED circuits have multiple forward voltages. See §VI.A.1, *above*. In context, a POSITA would clearly understand there is no disavowal in the file history. Accordingly, Petitioner's first construction should be rejected.

b. Petitioner's alternate construction is incorrect

95. Petitioner's second proposed construction (“a voltage in a diode's forward direction” (Pet., 25)) is also incorrect because it allows for forward voltages that could be less than the minimum operating voltage and greater than the maximum operating voltage. In essence, Petitioner's alternate construction

completely ignores the intrinsic record and the context in which “forward voltage” is used.

96. First, as discussed above, claims 3, 10, and 17 require the first LED circuit to be “operating.” *See also* Ex. 1001 [’705 Patent], claims 1, 4, 7, 8, 11, 14, 15, and 18 (also referring to “operating LED circuits.”). The forward voltage cannot be just *any* voltage because when the forward voltage is outside of the operating range of the LED circuit, the LED circuit will not provide light or will otherwise not operate. For example, at high voltages and currents, the LED would short or burn out. Similarly, as discussed above in §VI.A, the specification is clear that the forward voltage “drives” the LED circuits. *See, e.g.*, Ex. 1001 [’705 Patent], 3:15-18; 4:37-39; 4:42-49; 5:30-37. This means that the forward voltage applied to the LED circuit is within the appropriate range to allow the LED to illuminate as intended. Thus, Petitioner’s second proposed construction is also incorrect.

97. The forward voltage should therefore be construed as the operating voltage for the claimed LED circuit.

B. “Switch”

98. The Petition proposes the term “switch” and “selectable by a user switching the switch” for construction. Pet. 26. Petitioner argues that “[t]he ordinary meaning of ‘switch’ encompasses, for example, mechanical, electronic, electro-mechanical, and programmable switches. There is no disclaimer or lexicography that

would justify departing from that ordinary meaning.” Pet., 26. For purposes of this declaration, I do not dispute Petitioner’s construction except to note that in the claims of the ’705 Patent, the switch must be electrically connected between the DC voltage output of the LED driver and at least one of the first operating LED circuit or the at least one additional LED circuit. EX1001 [’705 Patent], claims 1, 8, 15.

C. “Selectable by a user switching the switch”

99. Petitioner argues that this term “includes ‘indirect’ selection of a switch by a user.” Pet., 27. The independent claims of the ’705 Patent require that the claimed “switch is electrically connected between the DC voltage output [of the LED driver] and at least one of the first operating LED circuit or the at least one additional LED circuit.” EX1001 [’705 Patent], claims 1, 8, 15. To the extent the Petitioner argues for “indirect” control, the switch (whether direct or indirect) must still be located between the LED driver and LED circuit.

VII. THE ’705 PATENT IS INELIGIBLE FOR POST GRANT REVIEW

A. The Claims Are Supported By Pre-AIA Applications

100. The Petition presents seven different sets of claims that it argues lack support for an effective filing date before March 16, 2013: (1) claims 1-20 of the ’705 Patent (Pet., 13-15), (2) claims 3, 10, and 17 of the ’705 Patent (Pet., 16-18), (3) claims 3, 10, and 17 of the ’341 Patent (the Parent to the ’705 Patent) (Pet., 19), (4) claims 4, 11, and 18 of the ’341 Patent (Pet., 20), (5) claims 1-15 of the ’001

Patent (the grandparent patent to the '705 Patent) (Pet., 21), (6) claim 15 of the '001 Patent (Pet., 21-23), and (7) claim 9 of the '705 Patent (Pet., 23). Each of these sets of claims is supported by pre-AIA applications.

101. The '705 Patent claims priority to three applications and two provisional applications filed before March 16, 2013:

- U.S. Patent Application Ser. No. 13/322,796, filed Nov. 28, 2011, nationalized from International Application No. PCT/US2010/001597, filed May 28, 2010, which claims priority to U.S. Provisional Application No. 61/217,215, filed May 28, 2009, and
- U.S. Patent Application Ser. No. 12/287,267, filed Oct. 6, 2008, which claims priority to U.S. Provisional Application No. 60/997,771, filed Oct. 6, 2007 (collectively, the "Pre-AIA Applications").

The Pre-AIA Applications are exhibits 1014-1019 in this PGR.

102. Counsel has informed me that Petitioner has the burden of establishing eligibility for post-grant review. I understand from counsel that a claim is not impossible if it can reasonably be interpreted in a manner that is possible. I also understand from counsel that the test for sufficiency of a written description is whether the disclosure clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] was in possession of the claimed invention (i.e., invented what is claimed.) I understand that there is no requirement that the

specification use the exact same words as the claims. As discussed below, in each case, a POSITA would recognize from at least the '597 PCT Application that the inventor was in possession of the inventions claimed in the '705 Patent.

1. The Embodiments of the '705 Patent Are Meant To Be Combined

103. Petitioner argues that separate aspects or embodiments disclosed in a specification may not be combined to satisfy the written description standard. Pet., 12-13. The determination of whether disclosure in different embodiments or different portions of the specifications may be claimed together is based on the disclosure of the patent and technology at issue, and the Petition does not provide this analysis.

104. The intrinsic record is clear that the various claimed aspects of the '705 Patent are meant to be combined—that is, different LED circuits are disclosed that are meant to connect and disconnect from one another in series and parallel configurations and from LED drivers and switches. *See* EX1001, ['705 Patent], 3:46-49 (“[i]t would further be advantageous to provide multi-voltage and/or multi-brightness level devices that can provide electrical connection options for either AC or DC voltage operation at preset forward voltage levels of 6V or greater.”). *See also id.*, 3:4-7, 8:10-14 (“Such packages can be of *varied make up* and can be *combined with each other* to create desired systems *given the scalable and compatible arrangements possible* with, and resulting from, the invention.”), 7:50-54 (emphasis added); EX2047 [Neikirk Dep. Tr.], 85:16-86:7 (Q ... which embodiment or

embodiments is [’705 Patent 8:3-14] referring to? A. Well, the first sentence is referring to packaging of the LEDs, so that could be any of them.”). Thus, the ’705 Patent intends for different packages (such as those disclosed in Figs. 1-3, 6, 8, and 10-12) to be “combined with each other” as well as different AC or DC power sources, switches and drivers. A POSITA would clearly understand the combinable and scalable nature of the different embodiments of the ’705 Patent given the above disclosure.

105. Further, the ’705 Patent repeatedly indicates that its different figures are related. *See, e.g.*, EX1001 [’705 Patent], 10:18-21, 10:30-34, 10:55-57, 10:62-64, 11:24-28, 11:42-45, 12:1-3. The Figures support this interpretation. Figs. 1-3, 6, 8, and 10-12 are examples of unconnected LED and rectifier circuits clearly meant to be integrated into larger circuits in various configurations. *Id.*, 9:66-10:1 (“to provide various connectivity options...”), 10:18-21, 10:30-34, 11:65-67 (“electrical contacts 96 are used to wire the at least two series LED circuits 92 into [various configurations].” Figs. 4, 5, 7 and 9 are examples of exemplary configurations for the circuits in the other Figures. *Id.*, 10:55-59, 10: 62-64, 11:24-28, 11:42-45.

106. Reviewing the Figures of the ’705 Patent, a POSITA would understand that the embodiments were meant to be combined. Some Figures are building blocks and some are examples of possible combinations. Figs. 1 and 2, for example, are examples of imbalanced bridge circuits meant to be combined with other

components (such as LEDs, switches, power sources, resistors, capacitors and inductors, as appropriate) to form larger circuits. Fig. 3 is an example of two LED circuits 32 that can be combined in different configurations to form larger circuits. Fig. 4 is one example configuration of the LED circuits 32 in Fig. 3, with a voltage source and resistor R1 added to the circuit, with the LED circuits 32 configured in parallel with each other. Fig. 5 is a similar example of the LED circuits 32 in Fig. 3, but this time configured in series. Figure 6 shows LED circuits similar to those shown in Fig. 3. Fig. 7 is the circuit of Fig 6 but with a switch and voltage source connected. Fig. 8 is an embodiment showing two unconnected LED circuits with bridge rectifiers added. Fig. 9 is the circuit of Fig. 8 with a switch and voltage source connected. Figure 10 is an unconnected bridge rectifier circuit meant for use in larger circuits. Figs. 11 and 12 are two unconnected LED circuits within an LED lighting device 90. In this case, Fig. 11 is directed to a single chip 90 and Fig. 12 is directed to an LED package 100.

107. Further, the '705 Patent is directed to "multiple voltage level ... light emitting diode circuits, single chips, packages and lamps" EX1001 ['705 Patent], 1:43-48. A POSITA would understand that the different chips and packages discussed in the '705 Patent are meant to be integrated into larger, scalable LED circuits depending on design considerations for the specific application. For

example, an application requiring more brightness or different color lights may require variations on the embodiments disclosed in the figures.

108. In other words, the '705 Patent and its ancestor applications describe an integrated invention with different “scalable and compatible” features, not an invention broken down into disparate, unrelated embodiments that are never linked together in the specification.

2. Claims 1-20 of the '705 Patent

109. Petitioner argues that the limitation “wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit” is new matter not present in any application from which the '705 Patent claims priority, and therefore not entitled to a priority date prior to March 16, 2013. Pet., 13-15. In my opinion, Petitioner is incorrect.

110. The '597 PCT (filed May 28, 2010, which issued as the '539 Patent) and the provisional applications to which the '597 PCT claims priority, provide support for every claim of the '705 Patent. *See* §X, below. For example, the '215 Provisional discloses this limitation. Specifically, the '215 Provisional discloses an embodiment where “a dimmer switch regulates voltage ... or may have integrated circuitry that allows for adjustability of the otherwise relatively fixed voltage ... output of the LED circuit driver.” Ex. 1014 ['215 Provisional], ¶[0022]; Ex. 1001

[’705 Patent], 9:22-29 (same). In this embodiment, “[t]he LED circuits get brighter as the voltage ... of the LED circuit driver output is increased to the LED circuit.” *Id.* Thus, the ’215 Provisional discloses a switch that adjusts the output of the LED driver to regulate the input to the LED circuit. *See generally* Ex. 1014 [’215 Provisional], ¶¶[0018]-[0022].

111. The Petition argues that “the dimmer switch in [the ’215 Provisional] is not disclosed as being connected between the output of the LED driver and the LED circuits as claimed.” Pet., 15. Petitioner’s argument contradicts the disclosure of the ’215 Provisional discussed above, which indicates the dimmer switch increases or decreases the voltage “output of the LED driver” to regulate “the input to the LED circuit.” Ex. 1014 [’215 Provisional], ¶[0022]. Further, the dimmer switch is “coupled to” the LED driver. *Id.*

112. The “dimmer switch” is “coupled to an “LED circuit driver.” An LED circuit driver has an input and an output. The “dimmer switch” adjusts “the output of the LED circuit driver.” A broad interpretation of this disclosure teaches that the dimmer switch can be placed at the input or the output of the LED circuit driver. A narrow interpretation of this disclosure teaches the dimmer switch must be placed at the output of the LED circuit driver. Either way, the disclosure teaches a POSITA that a dimmer switch can be placed at the output of an LED circuit driver. Therefore, the ’215 Provisional clearly teaches the dimmer switch can be placed at the output of

the LED driver. Further, this knowledge was clearly within the possession of the inventor at the time.

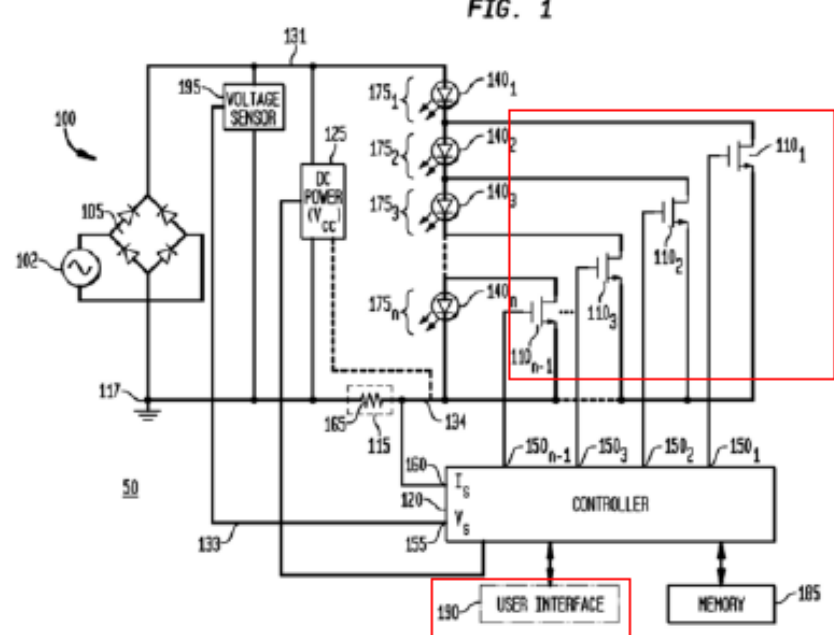
113. To the extent the Petition is arguing that the '215 Provisional does not disclose that the dimmer switch could be combined with the other LED circuits disclosed in the specification, such an interpretation would render the disclosure of the switch meaningless because a POSITA would understand the dimmer switch is meant to be used in a larger LED circuit. Indeed, the '597 PCT discloses a “switching means” ([Para 15]), “selectable desired operating voltage” ([Para 15]) and “means of switching” ([Para 35]) and references to “switching” and “switch” in numerous embodiments, any or all of which comprise a dimmer switch. A POSITA reading the '597 PCT would understand a dimmer switch is one exemplary embodiment of the disclosed switches.

114. Further, the phrase “the LED circuit driver” in ¶[0022] refers to “the LED circuit driver” in ¶¶[0018]-[0021], so the dimmer switch in ¶[0022] is clearly meant to be combined with the LED circuit driver and associated circuitry discussed in those paragraphs. In addition to above, the '215 Provisional recognizes that the embodiments disclosed therein “can be combined with each other.” Ex. 1014 ['215 Provisional], ¶[0016] (“Such packages can be of varied make up and can be combined with each other to create desired systems given the scalable and compatible arrangements possible with, and resulting from, the invention.”). Thus,

the '215 Provisional teaches its different embodiments can be combined, including the dimmer switch.

115. Indeed, the '597 PCT (which incorporates the '215 Provisional) discloses a “switching means” ([Para 15]), “selectable desired operating voltage” ([Para 15]) and “means of switching” ([Para 35]) and references to “switching” and “switch” in numerous embodiments, any or all of which would be understood by a POSITA to comprise a dimmer switch. Pet., 26-27 (discussing a dimmer switch as a type of “switch.”). In addition, the (pre-AIA) '597 PCT incorporates the '215 Provisional by reference and expands on its disclosure, for example, expressly discloses that LED circuits can be driven with DC voltage. (EX1018 ['597 PCT], [Para 25].

116. Note a POSITA would understand a dimmer switch can be implemented in various ways, including by switching particular LEDs in a circuit on or off to vary the brightness of the overall circuit. *See, e.g.,* Pet., 26-27 (stating that a dimmer switch “would comprise eletronics [sic]”). The Petition even calls out an annotated Fig. 1 of EX1025 [Shteynberg] (below) that shows a dimmer switch configuration wherein switches 110 switch LEDs 140 in and out one-by-one to control how many LEDs 140 conduct current. Pet., 28. The more LEDs that conduct current, the more forward voltage is supplied to the LED circuit and the brighter the



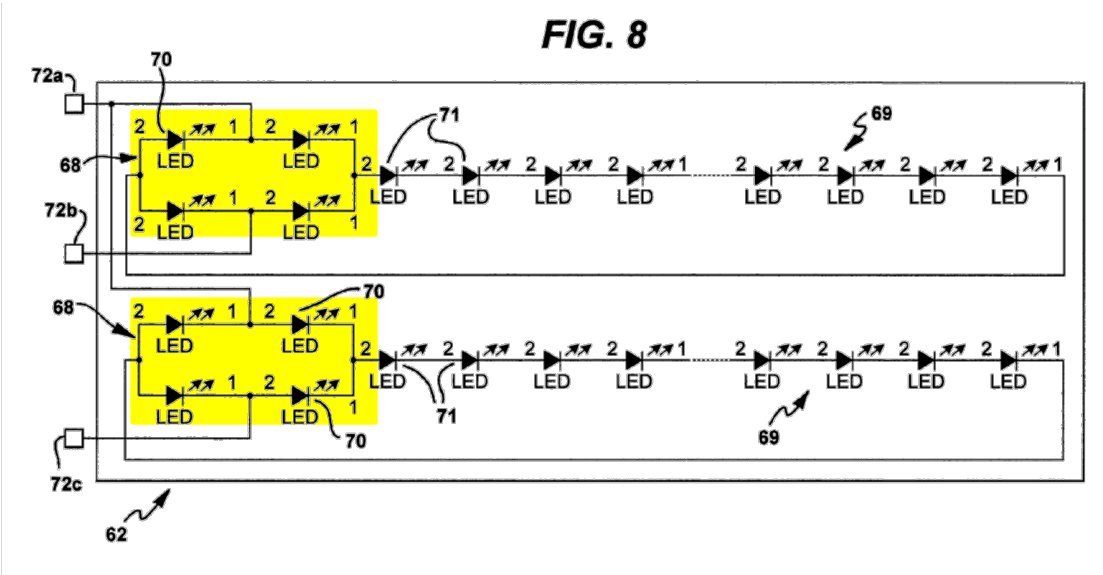
117. Petitioner argues that the '215 Provisional “does not disclose the claimed switch because [it] relates solely to AC driven LEDs.” Pet., 14. Petitioner is wrong for several reasons. Both the '215 Provisional and '705 Patent disclose ordinary drivers that output DC voltages to drive LED circuits. Ex. 1014 ['215 Provisional], ¶¶[0007] (“LEDs ... historically have been driven by DC voltage sources... Some LEDs ... provid[e] a higher voltage LED typically driven with 5V DC or 12V DC.”); Ex. 1001 ['705 Patent], 1:52-59 (same). The quotes above indicate that the “typical” LED driver outputs DC voltage.

118. Other embodiments also disclose drivers with DC voltage outputs. For example, the '215 Provisional discusses an “LED circuit inverter driver” that provides a “relatively fixed voltage as the LED circuit load changes.” Ex. 1014 ['215 Provisional], ¶[0019]. This output voltage is a “relatively constant output to a load.” *Id.* A POSITA would understand a “relatively fixed” or “relatively constant” output to comprise a DC voltage.

119. Similarly, the '215 Provisional's dimmer embodiment discloses an LED circuit driver with a “relatively fixed voltage and/or relatively fixed frequency output.” *Id.*, ¶[0022]. A POSITA would understand a “relatively fixed” voltage to comprise a DC voltage because DC voltages are fixed (i.e., constant). Further, the '215 Provisional Figs. 16-19 disclose bridge rectifiers that serve as drivers outputting DC voltages to LED circuits. Ex. 1014 ['215 Provisional], Figs. 16-19. Bridge rectifiers are LED drivers with an AC input and DC output. *See, e.g.*, EX2047 [Neikirk Dep. Tr.], 16:9-18 (“Q ... is it fair to say that bridge rectifiers convert AC to DC? ... A. ... Yes, that's a fair statement.”); 29:10-13 (“In general, a bridge could be part of a drive, certainly. Of a drive circuit, certainly.”).

120. Petitioner admits that the '796 and '597 PCT Applications disclose bridge rectifiers. Pet., 15 (“Pre-AIA Application nos. 13/322,796 (EX1016) and PCT/US2010/001597 (EX1018) disclose bridge rectifiers ...”). The Petition cites paragraph 59 (discussing Fig. 8) and Fig. 8 of the '796 Application. As shown

below, the circuit of '796 Application Fig. 8 appears to be substantively identical to Fig. 18 of the '215 Provisional. A POSITA understands that an LED driver can comprise a bridge rectifier. The bridge rectifiers (i.e., LED drivers) are highlighted in yellow below:



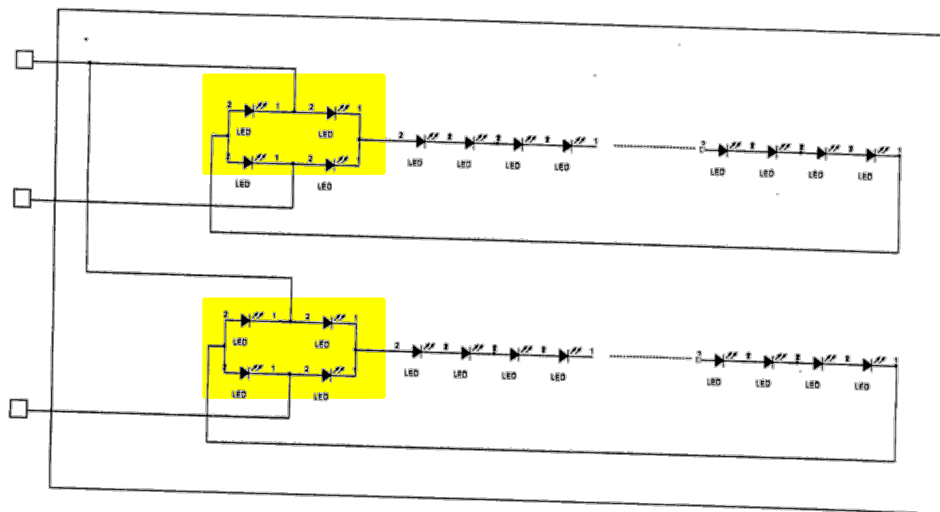


Fig. 18

121. Given Petitioner’s admission that the ’796 Application discloses bridge rectifiers (i.e., LED drivers with DC outputs) (Pet., 15) and Petitioner’s admission that “bridge rectifiers can be used to convert AC to DC.” (Pet., 10), there is no question the ’215 Provisional also discloses LED drivers in the form of bridge rectifiers. Petitioner distinguishes the bridge rectifiers in the ’796 Application because the ’796 Application allegedly “fail[s] to disclose the claimed switch, in isolation or in combination with the other aspects of the claim.” Pet., 15. As discussed above, this is not the case for the ’215 Provisional, because the ’215 Provisional expressly discloses switches between the output of the LED driver and the LED circuit. Ex. 1014 [’215 Provisional], ¶[0022].

122. Second, even if there were a requirement that the claims can only relate to embodiments disclosing AC driven LEDs (which there is not), the claimed LED

lighting systems *are* AC driven. Ex. 1001 [’705 Patent], 12:34-35 (“an LED driver including an input configured to connect to an AC voltage power source”); 13:12-13 (same), 14:15-16 (same). Consistent with the embodiments of the ’215 Provisional described above, the claimed LED driver’s input is AC and its output is DC. Thus, the claims are consistent with the disclosure in the ’215 Provisional.

123. Third, none of the alleged support Petitioner cites clearly indicates a definition of the claim term “LED driver” or a disavowal of claim scope such that the ordinary meaning of the term “LED driver”—which includes DC LED circuit drivers—would be disregarded. While Petitioner argues the ’215 Provisional defines “AC driven LED circuits” as “driven circuits,” (Pet., 14-15), the claim term here is “LED driver;” the term “driven circuits” is not used in the claims. Further, the inventor clearly disclosed that LED drivers can be part of LED circuits, and can convert AC to DC as in the bridge rectifier embodiments. *See, e.g.*, Pet., 10, 15, Ex. 1001 [’704 Patent], 1:43-48 (“The present invention specifically relates to multiple voltage level ... light emitting diode circuits, single chips, packages and lamps ‘devices’ for direct AC voltage power source operation, bridge rectified AC voltage power source operation or constant DC voltage power source operation.”). Additionally, as discussed above, the ’215 Provisional is clear that LED drivers typically output DC voltage (and that LED drivers can be configured to convert AC input to DC), and the Petition identifies nothing in the intrinsic record that requires a

departure from the plain and ordinary meaning. Further, the '597 PCT incorporates the '215 Provisional, thus the relevant disclosures of the '597 PCT must be considered as well.

124. Petitioner also argues that “there is no disclosure of combining this dimmer switch in [the '215 Provisional] with the other elements recited in the independent claims.” Pet., 15. Again, Petitioner’s argument contradicts the plain language of the '215 Provisional, which states “[a]ccording to other aspects of the invention, the LED circuit driver may be coupled to a dimmer switch...” Ex. 1014 [’215 Provisional], ¶¶[0022]. Thus, the dimmer switch disclosure is only one of several “aspects of the invention”. *Id.* Further, “the LED circuit driver” explicitly refers to the LED circuit driver disclosed throughout the various embodiments of the '215 Provisional. *Id.*, ¶¶[18]-[21]. Contrary to Petitioner’s arguments, the dimmer switch is not a standalone embodiment but was disclosed as an optional aspect of the invention to be combined with the other aspects of the invention.

125. The DI states that:

Patent Owner does not explain how or why the above-cited disclosure in the '215 provisional actually or inherently discloses (i.e., shows the inventors’ possession of) a switch electrically connected “between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit,” particularly where that same switch must also “switch[] a voltage level input to at least one of the first operating LED circuit or the at least one additional LED

circuit” or “switch[] the at least one additional LED circuit on or off,” as recited, for example, in claim 1.

DI, 22 (emphasis in original). But the ’215 Provisional actually discloses the LED driver is “coupled to a dimmer switch” that adjusts the “output of the LED driver” so that “the LED circuit driver output is increased to the LED circuits.” EX1014 [’215 Provisional], [Para 22]. Thus, the ’215 Provisional expressly discloses that the dimmer switch can be placed between the LED circuit and the LED driver. And the ’597 PCT (which expressly incorporates the ’215 Provisional by reference) states that LED circuits can be “driven with at least two different AC or DC forward voltages.” (EX1018 [’597 PCT], [Para 25]. Thus, the Pre-AIA ’597 PCT expressly discloses that LED circuit drivers can output DC voltage to LED circuits.

126. The DI states that the “same switch must also ‘switch[] a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit’ or ‘switch[] the at least one additional LED circuit on or off,’ as recited, for example, in claim 1.” The Board here points to claim limitations [1.e] and [1.f]. The Petition does not appear to raise this argument. Nonetheless, the ’597 PCT clearly discloses these limitations as well. *See* §X, below.

127. The DI also states that “Patent Owner ignores or at least does not sufficiently address the greater context of the above-cited disclosure in the ’215 provisional.” DI, 22. The Board’s basis for this conclusion relies exclusively on the

figures of the '215 Provisional to argue that “none of the twenty-one figures show a switch electrically connected between a DC voltage output and at least one of a first operating LED circuit or at least one additional LED circuits as recited in claim 1.”

DI, 22-23. There are several issues with this analysis. First, the '215 Provisional teaches that a switch can be placed between the output of an LED driver and the input of an LED circuit. EX1014 ['215 Provisional], [Para '215]. I understand from counsel that written description requirement can be satisfied by disclosure anywhere in the specification and does not have to be expressly disclosed in a figure.

128. Second, the '215 Provisional is incorporated by reference into the (pre-AIA) '597 PCT, thus I have considered '215 Provisional together with the '597 PCT for written description analysis. As discussed below at §X, the '597 PCT discloses that LED circuits (i.e., one or more) can be driven by DC voltages and that the switch can connect and disconnect the LED circuits.

129. Accordingly, the Pre-AIA applications fully support the claim limitation “wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.”

3. Claims 3, 10, and 17 of the '705 Patent

130. Claims 3, 10, and 17 of the '705 Patent recite “wherein the switching of the switch provides at least two different DC forward voltages to at least one of the

first operating LED circuit or the at least one additional LED circuit.” EX1001, 12:44-47, 13:22-25, 14:25-28. In other words, this element requires the concept of a switch that switches between two voltages to one or more circuits. Petitioner argues that the Pre-AIA applications do not support this limitation. Pet., 16-18.

131. Petitioner is incorrect. Claims 3, 10, and 17 of the ’705 Patent are supported by the pre-AIA applications. *See* §X, below. For example, the ’597 PCT expressly discloses a “multi-voltage AC or DC operable LED device” (Ex. 1018 [’597 PCT], ¶[0024]) that allows for “forward voltage drive selection.” Ex. 1018 [’597 PCT], ¶[0025]. The Petition failed to cite this language in arguing that the ’597 PCT does not disclose switching between two different forward voltages. Pet., 17. While the ’597 Application often discusses an “LED device” in this passage, a POSITA understands that the circuitry within the “LED device”—that is, the multi-voltage LED circuitry—constitutes an “LED circuit.” Further, there are other portions of the ’597 PCT that discuss multi-voltage LED circuits (*see, e.g.*, EX1018 [’597 PCT], [Para 5] (“multiple voltage level [] light emitting diode circuits”), [Para 13] (“multi-voltage [] circuit”). A POSITA would understand the ’597 PCT discloses a switch (forward voltage drive selection) that provides more than one (i.e., at least two different) DC forward voltages to an LED circuit (“LED device”) as required by the claims.

132. Further, the '597 PCT repeatedly discloses single multi-voltage LED circuits (that is, LED circuits that operate using more than one forward voltage) *See, e.g.,* Ex. 1018 ['597 PCT], ¶[0013] (“The art is deficient in that it does not provide a multi-voltage ... circuit monolithically integrated on a single substrate”), ¶[0014] (“It would further be advantageous to have a multi-voltage ... circuit that can provide options in voltage level, brightness level and/or AC or DC powering input power preference.”), ¶[0015] (“It would further be advantageous to provide multiple voltage level ... light emitting LED circuits ... that can be driven with more than one AC or DC forward voltage...”). Again, the Petition failed to discuss this clear disclosure. Pet., 17.

133. Thus, the '597 PCT includes examples where (1) multiple voltages are provided to an LED “circuit” in the singular, and (2) multiple voltages are provided to LED “circuits” plural, which encompasses scenarios where each circuit is provided multiple voltages and scenarios where multiple circuits are provided different voltage levels.

134. Indeed, the '597 PCT describes a scenario in which a switch configured to provide a second, different forward voltage would not only be possible, but would be beneficial. Ex. 1018, ['597 APCT], ¶¶[0028], [0030] (describing scenarios where an LED device is “driven with at least two different DC forward voltages” and provides “a first forward voltage drive level when the two single voltage LED

circuits are connected in parallel and a second forward voltage drive level ... when the at least two LED circuits are connected in series.”). In these embodiments, the “LED device” still comprises a single multi-voltage circuit and the second DC forward voltage is different than the first DC forward voltage. Ex. 1018, [’597 PCT], ¶¶[0028], [0030] (describing the second forward voltage level as “twice the level of the first forward voltage drive level”).

135. Alternately, the dimmer switch embodiment of the ’215 Provisional discussed above provides multiple levels of voltage to one or more LED circuits. *See supra*, §VII.A.2; Ex. 1001 [’705 Patent], 9:22-29, Ex. 1014 [’251 Application], ¶[0022].

136. The Petition fails to address these clear supporting disclosures. Instead, Petitioner argues that these claims are rendered impossible due to Petitioner’s overly limiting construction of “forward voltage.” Pet., 16. In other words, Petitioner is using its unsupported construction to create an impossibility argument for straightforward claims that would clearly be understood to be possible. For the reasons discussed above, in my opinion, Petitioner’s construction is incorrect. A POSITA would clearly and unambiguously understand the language of these claims.

137. Petitioner also argues that “[n]o Pre-AIA Application discloses the claimed switch under any [] construction.” Pet., 16. However, Petitioner provides no explanation and cites only to its section on claim construction and its expert

declaration at paragraphs 41-43. *Id.*, 16-17. Paragraphs 41-43 of Petitioner’s expert declaration are essentially a copy of the conclusory analysis in the Petition. Further, as discussed above, Petitioner’s limiting claim constructions are unsupported and incorrect. *See supra*, §VI.A. Thus, I disagree with Petitioner’s position.

138. Petitioner argues that the Pre-AIA applications do not provide support for “two different DC forward voltages” but only provides cursory references to those applications. Pet., 17-18. Petitioner’s arguments leave out numerous contradictory disclosures. For example, the ’215 Provisional discloses a dimmer switch “that allows for adjustability of the otherwise relatively fixed voltage ... of the LED circuit driver.” Ex. 1014 [’215 Provisional], ¶[0022]. “The LED circuits get brighter as the voltage... of the LED circuit driver output is increased to the LED circuits.” *Id.* Thus, the ’215 Provisional expressly teaches providing multiple [i.e., at least two different] forward voltages to one or more LED circuits. *Id.* Similarly, as described above in §VII.A.2 and this section, the ’597 PCT expressly teaches providing multiple forward voltages to an LED circuit. Accordingly, Petitioner’s analysis is incorrect.

139. Petitioner argues that claims 3, 10, and 17 are unsupported in any pre-AIA application because these claims “include embodiments wherein the two different voltages are applied to only one of the individual LED circuits” and there is allegedly “no disclosure of a switch providing two different voltages to one ‘or’ the

other LED circuit as claimed.” Pet., 18. To the contrary, the pre-AIA applications clearly support such scenarios. For example, the switch of ’215 Provisional may have “at least two positions each of which is connected to at least one circuit within the multi-brightness single chip AC LED.” Ex. 1014 [’215 Provisional], ¶[0013]. Thus, the ’215 Provisional teaches its switch may have numerous positions (“at least two”) and some of those positions may each be connected to a single circuit or multiple circuits (i.e., “at least one”). And, as discussed above, the different positions of the switch provide different voltages (i.e., “multi-voltage.”) to the LED circuit. Ex. 1014 [’251 Application], ¶[0022]; Ex. 1018, [’597 PCT], ¶¶[0028], [0030]. This disclosure encompasses scenarios where a switch has, for example, four different positions—two of which provide two different voltage levels to a first circuit and two of which provide two different voltage levels to a second circuit.

140. The Institution Decision states as follows:

Neither the cited portions of the ’597 PCT nor the entirety of the ’597 PCT provides written description support for situations (1) and (2) under *any* construction of “forward voltage” as it appears in the claim term “two different DC forward voltages” recited in claims 3, 10, and 17. The cited portions of the ’597 PCT disclose “a first forward voltage drive level when the two single voltage LED *circuits are connected in parallel* and a second forward voltage drive level that is twice the level of the first forward voltage drive level when the at least two LED *circuits are connected in series*.” Ex. 1018 ¶ 28

(emphases added). That is, the forward voltage drive level in the '597 PCT depends on whether the (at least) two single voltage LED circuits are connected together in parallel or in series. This is distinguishable from situations (1) and (2) because the cited portions do not disclose that the two different forward voltage drive levels are applied to only one single voltage LED circuit—the cited portions describe only a situation in which at least two LED circuits are required.

DI, 28-29 (emphasis in original). This analysis misunderstands the claim language. Claim 1, for example, requires a “first operating LED circuit” and “one additional LED circuit” that is “configured to emit a different color light.” EX1001 [’705 Patent], claim 1. Thus, the difference between the “first operating LED circuit” and “one additional LED circuit” is that they emit different colors of light. *See, e.g.*, EX1018 [’215 Provisional], [Para 21] (“Individual LED circuits being the same or different colors, each requiring different forward voltages and currents may be driven from a single source LED circuit driver.”).

141. Claim 3 (which depends on claim 1) requires “the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.” *Id.*, claim 3. Thus, the claim *allows both the* “first operating LED circuit” *and the* “one additional LED circuit” can have *multiple voltages*—or in other words, to be “multiple voltage level ... LED circuits.” EX1018 [’597 PCT], [Para 15]. *See, e.g., Id.*, [Para 5] (“The present invention specifically relates to multiple voltage level [] light emitting diode

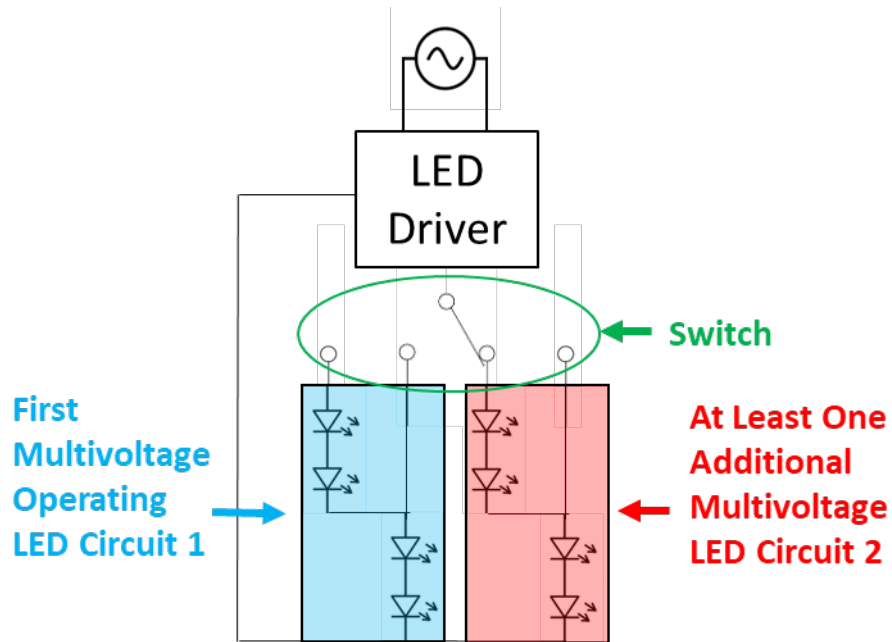
circuits”). In other words, the claims allow at least two different color LED circuits where the voltage (and, correspondingly, brightness) of each different color LED circuit can be adjusted.

142. The Institution Decision’s analysis assumes the “first operating LED circuit” and “one additional LED circuit” must be “*single voltage* LED circuits.” DI, 28-29. To the contrary, the claims expressly require either or both the “first operating LED circuit” and “one additional LED circuit” are “*multiple voltage*” LED circuits. EX1001 [’705 Patent], claim 3 (“ at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.”). Nothing in the claims or specification states that an LED circuit must be single voltage and no POSITA would reasonably interpret “LED circuit” to exclude multiple voltage LED circuits, given the clear teachings otherwise discussed above.

143. To state another way, the claims require (1) a switch to switch voltage levels to at least two LED circuits (*see, e.g.*, EX1018 [’597 PCT], [Para 15]), (2) the at least two LED circuits are different colors (*see, e.g.*, EX1014 [’215 Provisional], [Para 21]), and (3) the two LED circuits are each multi-voltage LED circuits. *See, e.g.*, EX1018 [’597 PCT], [Paras 5, 15]. Each of these limitations is expressly disclosed in the ’597 PCT and/or the ’215 Provisional that it incorporates by reference. And the pre-AIA applications disclose that the disclosed LED circuits

“can be of varied make up and can be combined with each other” and are “scalable and compatible” with one another. EX1014 [’215 Provisional], [Para 16].

144. One example of a circuit that satisfies situations (1) and (2) is shown below:



145. Depending on the position, the illustrated switch provides multiple different voltages to either situation (1) (*e.g.*, circuit 1, shown in blue) or situation (2) (*e.g.*, circuit 2, shown in red). Further, a POSITA would understand the ’597 PCT supports the use of multiple switches and/or more than two circuits in combination in a circuit. *See, e.g.*, EX1018 [’597 PCT], Abstract (“Brightness level selectability” is not limited to two levels), [Para 15] (using the term “switching means,” which encompasses two or more switches), and “at least one additional LED circuit,” which encompasses two or more LED circuits); EX1014 [’215

Provisional] [Para 16] (“such packages can be of varied makeup and can be combined with each other ... given the scalable and compatible arrangements possible with, and resulting from, the invention”), Fig. 15 (showing three different LED circuits). In short, the ’597 PCT expressly discloses scalable and combinable multivoltage LED circuits as disclosed in claims 3, 10 and 17. And the Petition construed “switch” in the ’705 Patent as “comprising” multiple “switches” including “transistors.” Pet., 26-27. Thus, a POSITA would understand the claimed “switch” can be several different switches operating together.

146. Thus, claims 3, 10 and 17 are supported by the pre-AIA applications.

4. Claims 3, 10, and 17 of the ’341 Patent

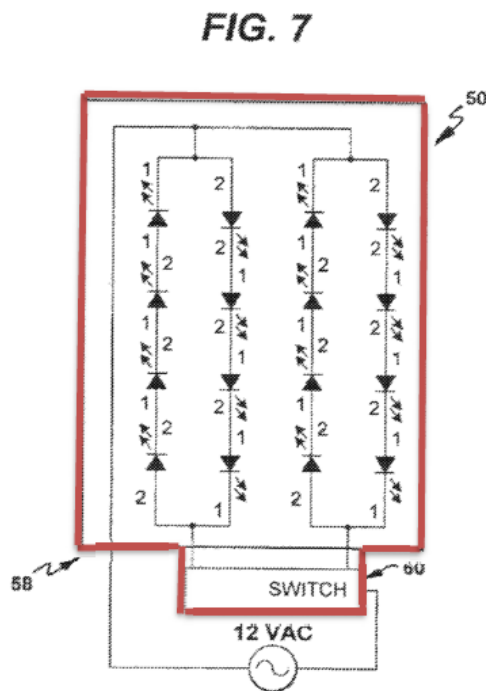
147. Claims 3, 10 and 17 of the ’341 patent contain the same limitation as claims 3, 10, and 17 of the ’705 patent: “wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.” Ex. 1006, 12:30-33, 13:1-4, 14:13-16. Thus, these claims are supported by pre-AIA applications for the reason discussed above in §VII.A.3.

5. Claims 4, 11, and 18 of the ’341 Patent

148. The Petition argues that claims 4, 11, and 18 of the ’341 Patent claim “impossible subject matter” that “is not disclosed in the Pre-AIA Applications.” Pet.,

20. Petitioner's argument rests on an improperly narrow interpretation of the claims that departs from the common understanding of the term.

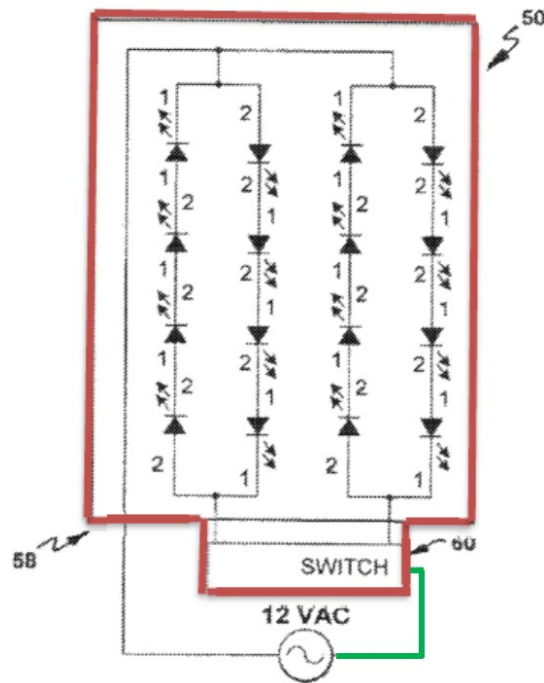
149. A POSITA would easily understand these claims to be possible. Claim 4 requires "an LED lighting device comprising ... a switch" wherein that "switch is connected between the AC voltage power source and the LED lighting device." Ex. 1006 ['341 Patent], claim 4. Thus, this claim is directed toward an arrangement similar to Fig. 7 of the '341 Patent, except that the box 50 comprising the LED device is extended to encompass switch 60 as shown in the red box below:



150. Thus, the switch is within the lighting device but at the same time is connected between the lighting device and the power source. A POSITA would understand this as a typical arrangement for an LED device containing a switch

similar to a desk lamp. The independent claims characterize the LED device as “comprising” the switch and claims 4, 11, and 18 specify where in the LED device the switch would be connected relative to the power source. In other words, the claims are directed to a switch that acts as the interface between the AC voltage power source and the LED lighting device. *See, e.g.*, Ex. 1006 [’341 Patent], Figs. 7, 9 (showing a switch located between a voltage source and the rest of a LED device). As the interface, this switch is both *a part of* the LED lighting device (as the independent claims require) and *connected between* the AC voltage power source and the LED lighting device (as the dependent claims require). Annotated Fig. 7 shows a connection (in green) between the AC power source and the LED lighting device (in red):

FIG. 7



151. This connection is between the AC power source and the switch as required by the claim.

152. Finally, Petitioner has not satisfied and cannot satisfy its burden to show that claims 4, 11, and 18 are not supported in Pre-AIA Applications. The features of these claims are clearly supported and disclosed in at least the '597 PCT. For example, Figs. 7 and 9 of the '597 PCT clearly disclose a 2-way switch 60 connected between an AC power source and an LED lighting device. Ex. 1018, Figs. 7, 9, [0057]–[0058]. Further, the '597 PCT discloses embodiments where the switch is part of the LED lighting device. *See* Ex. 1018 ['597 PCT] (“The multi-voltage ... single chip AC LED and /or package is configured to provide a means of

switching...”). Thus, claims 4, 11, and 18 of the ’341 Patent are supported by at least the ’597 PCT.

1. Claims 1-15 of the ’001 Patent

153. Petitioner argues that Claims 1–15 of U.S. Pat. No. 10,537,001 (the “’001 Patent,” the parent of the ’341 Patent and grandparent of the ’705 Patent) are not supported by any applications filed before March 16, 2013. Pet., 21. Petitioner’s argument is based on the limitation in ’001 Patent independent claims 1 and 11, which recites “a switch that is selectable by a user and configured to at least one of independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit.” Ex. 1020 [’001 Patent], claims 1 and 11.

154. I disagree with Petitioner. The ’597 PCT expressly discloses a “multi-voltage AC or DC operable LED [lighting] device” (Ex. 1018, ¶[0024]) that allows for “forward voltage drive selection.” Ex. 1018, ¶[0025]. Further, the ’597 PCT discloses a “switching means that connects and/or disconnects at least one additional LED circuit to and/or from a first LED circuit.” Ex. 1018, ¶[0015]. *See also* Ex. 1018, ¶¶[0018] (“It would further be advantageous to provide multi-brightness LED devices that can be switched to different levels of brightness by simply switching additional circuits on or off in addition to a first operating circuit within a single chip and or LED package.”), [0056] (“the other side of an AC voltage source line is individually electrically connected to 56b and 56c with either a fixed connection or a

switched connection...”), [0057] (“Figure 7 discloses a schematic diagram similar to the multi-voltage and/or multi-brightness LED device 50 shown in figure 6 integrated within a lamp 58 and connected to a switch 60 to control the brightness level of the multi-voltage and/or multi-brightness LED lighting device 50.”); [0058] (“When one side of an AC voltage is applied to 72a and the other side of an AC voltage line is applied to 72b and 72c individually, the brightness level of the multi-brightness LED lighting device 62 can be increased and/or decreased [in] a fixed manner or a switching process.”); Fig. 7 (showing a “2-way switch” that can switch either or both circuits on or off).

155. These examples disclose allowing a user to “individually” (i.e., independently) “connect[] and/or disconnect[]” multiple LED circuits on and off and switch “additional circuits on or off in addition to a first operating circuit.” That is, the first operating circuit can be switched “on or off” as well as the additional circuits. Accordingly, the independent claims of the ’001 Patent are supported by at least the ’597 PCT.

2. Claim 15 of the ’001 Patent

156. The Petition argues that the dimmer switch of ’001 Patent, claim 15 is not supported in any pre-AIA application because “claim 15 requires a second “dimmer switch” that adjusts a voltage of the mains power source, which voltage is then received by the driver in the LED device.” Pet., 21–23. This is incorrect.

157. First, the '597 PCT and '215 Provisional clearly disclose that a switch can adjust the voltage of an AC mains power source. *See, e.g.*, Ex. 1018 ['597 PCT], Fig. 9 (showing “2-way switch” 74 connected to AC power source); Ex. 1014 ['215 Provisional], Fig. 15 (showing “3-way switch” coupled to a “120 VAC” [i.e., AC mains] power source), Fig. 19 (showing “2-way switch” coupled to an AC power source). Second, the '215 Provisional teaches the switch may be a dimmer switch. Ex. 1014 ['215 Provisional], ¶[0022] (“the LED circuit driver may be coupled to a dimmer switch that regulates voltage or frequency ...”). Therefore, a POSITA would understand the pre-AIA applications disclose a “dimmer switch [that] adjusts a voltage of the mains power source” as recited in claim 15.

158. Petitioner argues that the '215 Provisional does not support claim 15 because the dimmer of claim 15 “adjusts a voltage of the mains power source” while the '215 Provisional allegedly discusses a dimmer that “is coupled to the driver and adjusts the output of the driver.” Pet., 22. Petitioner’s distinction is not meaningful. The '215 Provisional states the “LED circuit driver may be coupled to a dimmer switch.” Ex. 1014 ['215 Provisional], ¶[0022]. That does not require the dimmer switch to be located at the output of the driver. A dimmer switch coupled to the input of the driver (between the mains power source and LED driver) would increase or decrease the voltage to the LED driver, thereby adjusting the voltage at the output of the LED driver.

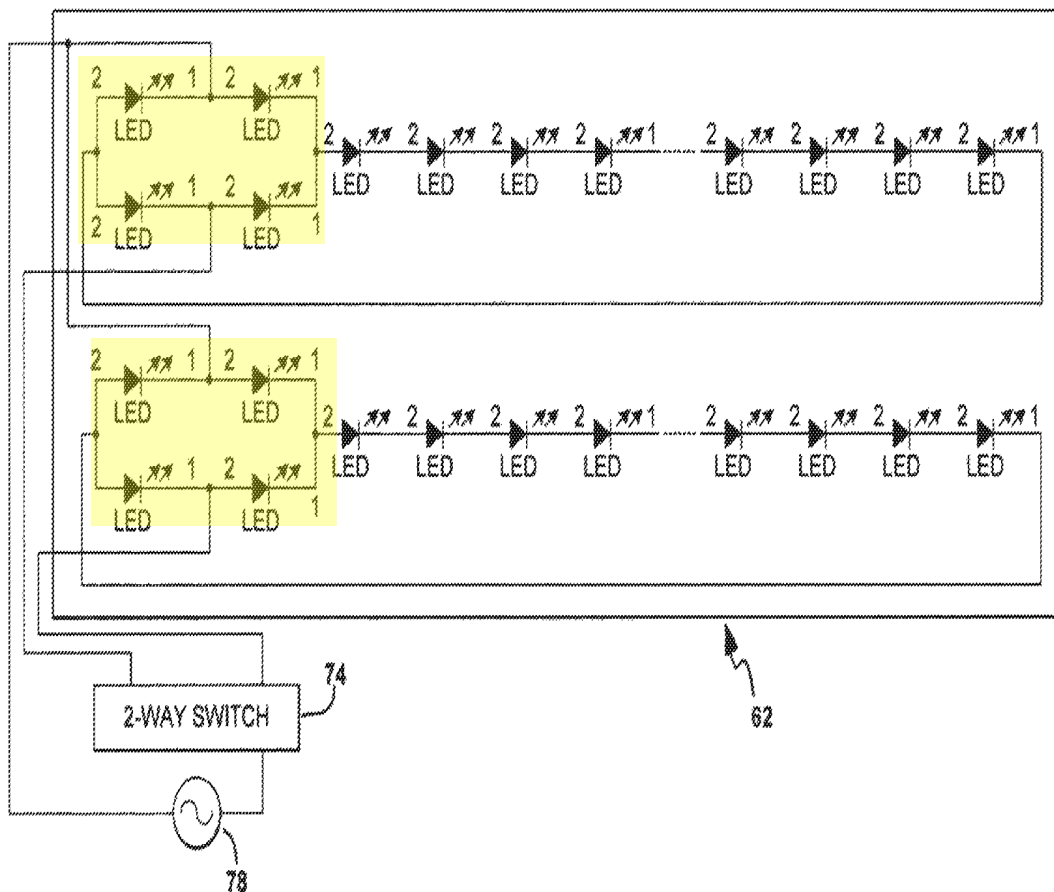
159. Petitioner also argues that “[n]o Pre-AIA Application discloses ... wherein the dimmer switch functions ‘regardless of a user’s selection via the switch.’” Pet., 22. But the ’215 Provisional’s dimmer switch is just one “aspect[] of the invention,” meaning it is intended to be incorporated into (and used as part of) other embodiments. Ex. 1014 [’215 Provisional], ¶[0022]. *See* §§VII.A.2-3, *supra*. And the pre-AIA applications disclose numerous different switches. *See, e.g.*, Ex. 1014 [’215 Provisional], ¶[0013], Figs. 12, 13, 15, 19; Ex. 1018 [’597 PCT], ¶¶[0008], [0015], [0018], [0035], [0037], [0056]-[0059], Fig. 7, Fig. 9. Indeed, Petitioner even construed the term “switch” to “comprise” multiple “transistors” and “switches,” meaning Petitioner interprets this term to apply to multiple switches operating in conjunction with LED circuits. Pet. 26-27. Thus, because the ’215 Provisional teaches the dimmer switch can be used in conjunction with the other disclosed switches, the inventor clearly possessed use of a dimmer switch in conjunction with other switches, and nothing in the other pre-AIA applications indicates to the contrary or otherwise prohibits more than one switch.

3. Claim 9 of the ’001 Patent

160. The Petition additionally argues that ’001 Patent claim 9 is not supported by any application prior to March 16, 2013, because claim 6 of the ’001 Patent requires an “LED lighting device is configured to connect to a driver” and claim 9 requires an LED lighting device “further comprises the driver.” Pet., 23. I

disagree for several reasons. First, the “Pre-AIA Applications” clearly support a driver connected to an LED lighting device. *See, e.g.*, Ex. 1014, ¶¶[0021], [0022]; Ex. 1018, ¶¶[0025], [0030] (describing different drive settings for LED lighting devices). Second, there is nothing inconsistent in the structure of the claims. Independent claim 6 of the ’001 Patent does not specify where the driver is located; dependent claim 9 is simply narrowing the independent claim by specifying the driver is part of the LED lighting device. Indeed, embodiments such as Fig. 9 of the ’001 Patent show the driver (the bridge rectifier, in yellow, below) as part of the LED lighting device 62:

FIG. 9



VIII. GROUND 1: CLAIMS 3, 10 AND 17 SATISFY 35 U.S.C. § 112

B. Claims 3, 10 and 17 Are Possible

161. Claims 3, 10 and 17 recite “wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.” Ex. 1001 [’705 Patent], Claims 3, 10, 17.

162. The Petition argues that claims 3, 10, and 17 are invalid under 35 U.S.C. § 112 for indefiniteness, lack of written description and enablement because

Petitioner's first proposed construction of "forward voltage" ("the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs.") renders these claims impossible to perform. Pet., 28-30. In other words, Petitioner proposes a nonsensical construction, and then argues that the claims are impossible if the nonsensical construction is applied. *See, e.g., Wasica*, 853 F.3d at 1288 n.10 (Fed. Cir. 2017) ("It is highly disfavored to construe terms in a way that renders them void, meaningless, or superfluous.").

163. As discussed above in §VI.A.2, Petitioner's first proposed construction is incorrect. Limiting claims 3, 10, and 17 to a single forward voltage when the claims require "two different" forward voltages, thereby disregarding the express disclosure of both the claims and specification as well as the well-understood reality of how LEDs operate, is incorrect in my opinion. Further, Petitioner does not (and cannot) dispute that under either the correct construction for "forward voltage" of "the operating voltage for the claimed LED circuit" or Petitioner's second (incorrect) proposed construction, claims 3, 10, and 17 are possible. Pet., 28-30.

164. Even under Petitioner's first (incorrect) construction, the claim recites permissible features. Petitioner's first proposed construction is "the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs." Pet., 24. Two different

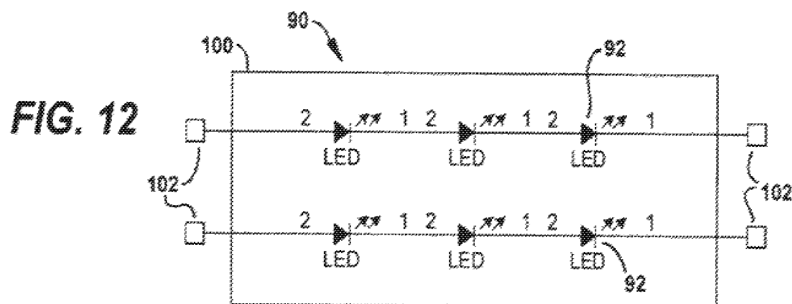
forward voltages can clearly be applied to the two different LED circuits—that is, one forward voltage for the “first operating LED circuit” and a different forward voltage for the “one additional LED circuit.” Even under Petitioner’s flawed argument, there does not appear to be any dispute about the above interpretation.

165. Instead, Petitioner’s argument rests on the incorrect assumption that each LED circuit can have only a single forward voltage. *See* Pet., 29 (“Because each circuit has only a single ‘forward voltage,’ no switch can provide ‘at least two different’ forward voltages to either circuit.”). This assumption directly contradicts the express teachings of the ’705 Patent. For example, claim 1 (from which claim 3 depends) recites a switch capable of “switching a voltage level input” to the LED circuits. Thus, the claim itself requires an LED circuit to have more than one voltage level option that can be delivered to the LED circuit and are selectable by a switch.

166. Further, the specification clearly and repeatedly teaches that LED circuits may have more than one voltage level. *See, e.g.*, Ex. 1001 [’705 Patent], 3:4-7 (“It would further be advantageous to have a multi-voltage and/or multi-brightness circuit that can provide options in voltage level, brightness level and/or AC or DC powering input power preference.”), 3:8-15 (“It would further be advantageous to provide multiple voltage level ... LED circuits ... that can easily be electrically configured for at least two forward voltage drive levels...”), 11:46-49 (describing Fig. 9 as a “multi-voltage ... LED device.”) *See also* §§VI.A.1, VII.A.3, above

(discussing additional examples from the specification of an LED circuit receiving multiple voltages). In one example, the '705 Patent explains that this multiple voltage level functionality “is achieved by electrically connecting the LED circuits in a series or parallel circuit configuration.” Ex. 1001 ['705 Patent], 3:15-23. The LED circuits use “a switching means that connects and/or disconnects at least one additional LED circuit to and/or from a first LED circuit.” Ex. 1001 ['705 Patent], 3:15-23.

167. The '705 Patent describes numerous embodiments with similar multi-voltage functionality. For example, Fig. 12 of the '705 Patent (below) illustrates one multi-voltage configuration:



168. The '705 Patent explains (consistent with other embodiments) that “[t]he LED package 100 has electrical contacts 102 that are used to wire the at least two series LEDs circuit [92] into a series circuit, a parallel circuit or in anti-parallel to form an AC LED circuit all within a single LED package.” Ex. 1001 ['705 Patent], 12:10-14. *See also id.*, 8:10-15. In other words, the '705 Patent teaches

connecting LED circuits in series and parallel configurations to form new circuits. Each of these new circuits may (depending on the configuration) have a different forward voltage.

169. Putting these teachings in the context of claim 3, when the LED circuits of Fig. 12 are connected in series, they would form an LED circuit with one forward voltage. However, when the LED circuits are connected in parallel, the resulting LED circuit would have a second (different) forward voltage. In other words, a central teaching of the '705 Patent is that its LED circuits can be connected in different configurations (e.g., series or parallel) and that these different configurations may have different forward voltages. The inventor clearly understood an LED circuit may have different forward voltages depending on whether the LEDs in the circuit are connected in series or parallel. Accordingly, claims 3, 10 and 17 are possible.

C. Claims 3, 10 and 17 Satisfy the Written Description Requirement Under Any Construction

170. The Petition also argues that claims 3, 10 and 17 lack written description support even under the correct construction of “forward voltage.” Pet., 31-32. Petitioner’s argument is that no “embodiments [of the '705 Patent] include a switch, wherein switching the switch provides two different DC forward voltages to an LED circuit.” Pet., 32. I disagree.

171. Petitioner’s argument ignores explicit disclosure that a POSITA would understand to disclose switches providing different DC forward voltages to an LED circuit. For example, at 3:12-19, the ’705 Patent states:

This invention comprises circuits and devices that can be driven with more than one AC or DC forward voltage “multi-voltage” at 6V or greater based on a selectable desired operating voltage level that is achieved by electrically connecting the LED circuits in a series or parallel circuit configuration and/or more than one level of brightness “multi-brightness” based on a switching means that connects and/or disconnects at least one additional LED circuit to and/or from a first LED circuit.

Ex. 1001 [’705 Patent], 3:12-19.

172. This disclosure alone discloses “a switch” (e.g., switching means) “wherein switching the switch” (e.g., connecting or disconnecting the at least one additional LED circuit to and/or from a first LED circuit) “provides two different DC forward voltages” (e.g., more than one AC or DC forward voltage) to an LED circuit (one additional LED circuit or the first LED circuit or the combination of the one additional LED circuit with the first LED circuit). There are numerous other embodiments of the ’705 Patent disclosing similar configurations. *See, e.g.*, Ex. 1001 [’705 Patent], 4:33-45, 5:35-51, 5:52-6:3; Figs. 8, 9, 11, 12. To the extent there

are minor differences between an embodiment and the specific claim language (e.g., the term “switch” is not explicitly mentioned in a particular embodiment or the embodiment does not specify whether it uses AC or DC), a POSITA would easily understand how to implement those differences and would understand that they can look to other embodiments for the differences.

173. Accordingly, in my opinion, claims 3, 10 and 17 are supported by the written description of the '705 Patent.

IX. GROUND 3: CLAIMS 1-3, 5, 7-10, 12, 14 AND 16 ARE NOT OBVIOUS OVER BRUNING IN VIEW OF EVANICKY

A. “Wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.”

174. Independent claims 1 and 8 require “the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.” EX1001 ['705 Patent], claims 1 and 8. Claims 1 and 8 also require the switching “is selectable by a user switching the switch.” *Id.*

175. Petitioner argues:

In the combination, the color-specific switches of Bruning are the switch, and they are indirectly selectable by the user via the knob/slider of Evenicky [sic] and the controllers. Alternatively, the combination of the color-specific switches of Bruning, the controllers,

and the slider/knob of Evanicky together are the switch, which is directly selected by the user.

Pet., 54, 56.

176. In Petitioner's first combination, "the color-specific switches of Bruning" are not "selectable by a user switching the switch." In Petitioner's first combination, "the color-specific switches of Bruning" are not "selectable by a user switching the switch." The user in this combination is switching Evanicky's "knob/slider. To the extent Petitioner relies on Evanicky's "knob/slider" as "indirectly" switching the switch, the "knob/slider" of Evanicky is not "electrically connected between the DC voltage output and one of the first operating LED circuit or the at least one additional LED circuit" as required by the claims. The same is true for Petitioner's second combination. Accordingly, Petitioner's argument fails.

A. "Wherein the switch has at least two positions"

177. Claims 2, 9 and 16 require "the switch has at least two positions." EX1001 ['705 Patent], claims 2, 9 and 16. Petitioner argues that "[i]n the combination, the switch includes the slider or knob of Evanicky. A slider or knob explicitly discloses at least two positions, as the user will slide the slider or turn the knob between multiple positions." Pet., 54. *See id.*, 57, 59. As discussed above, Evanicky's slider/knob is not electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED

circuit.” Instead, this combination relies on Bruning’s transistors for that limitation. Pet., 54. But transistors have no movable positions (such as, for example, a two-way switch)—they are simply controlled to allow current to pass through. They are semiconductor devices with no mechanical gap and no moving parts, so they cannot have “at least two positions.” Accordingly, Bruning and Evanicky do not disclose this limitation.

X. GROUND 4: CLAIMS 1-2, 5, 7-9, 12, 14-16, AND 19 ARE NOT ANTICIPATED BY DOHENY

178. I understand from counsel that a reference cannot be considered prior art to a claim if it does not predate the claimed invention. I further understand from counsel that a patent claim is entitled to the filing date of an ancestor application as its effective priority date if the patent claim has written description support in that ancestor application, as well as all intervening ancestor applications.

179. The provisional application that Doheny claims priority to was filed on February 19, 2016. EX2011 [Doheny], ¶[0001]. The ’802 Application (which issued as the ’705 Patent) claims priority to a series of continuations dating back to the ’597 PCT Application, filed on May 28, 2010 and the ’215 Provisional, filed on May 28, 2009. *See supra*, §V.B. The ’597 PCT, ’215 Provisional, and every intervening continuation application are expressly incorporated by reference into the ’802 Application. *Id.*, Ex1001 [’341 Patent], 1:21-23. In turn, each of those intervening applications expressly incorporates all prior applications (including the ’597 PCT

Application) by reference. EXS1020 [’001 Patent], 1:18-20; EX2050 [’393 Patent], 1:17-19; EX2049 [’098 Patent], 1:14-16; 2043 [’539 Patent], 1:14-15; 1018 [’597 PCT Application], [Para 1]. Thus, there is continuity of disclosure because the disclosure in the ’597 PCT Application and ’215 Provisional is part of the ’705 Patent and each prior intervening ancestor application.

180. In my opinion, the claims of the ’705 Patent are supported by disclosure in the ’597 PCT application. Below, I provide a chart showing how each limitation of the claims of the ’705 Patent are supported by exemplary disclosure in the ’597 PCT Application or the ’215 Provisional (which, as discussed above, is incorporated by reference into the ’597 PCT Application). Because the claims of the ’705 Patent are supported by applications filed before Doheny, Doheny does not qualify as prior art.

’705 Patent Claim	’597 and ’215 Application Support
[1.pre] An LED lighting system comprising:	<i>See ,e.g, EX1014 [’215 Provisional], [Para 14] (“LED lighting device or system”); [Para 16] (“the LED circuits and AC drivers of the present invention permit pre-packaging of the LED portion of a lighting system”); [Para 17] (“AD driven LED circuits [] permit or enable</i>

	lighting systems where LED circuits may be added or subtracted... .”)
[1.a] a first operating LED circuit and at least one additional LED circuit,	<i>See, e.g.</i> EX1018 [’597 PCT Application], Abstract (“LED lighting device having at least two LED circuits ...”); [Para 15] (“circuits and devices that can be driven with more than one AC or DC forward voltage ‘multi-voltage’ ... that is achieved by electrically connecting the LED circuits in a series or parallel circuit configuration”). Figs. 1-9, 11-12 (each showing two LED circuits, sometimes unconnected and sometimes connected together in a larger multi-voltage or multi-current LED circuit).
[1.b] at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs	<i>See, e.g.</i> EX1018 [’597 PCT Application], [Para 28] (“Each single voltage LED circuit has at least two LEDs connected to each other in series.”); Figs. 1-9, 11-12 (each showing at least two

connected in either series or parallel, and	LED circuits, each of which has two or more LEDs connected in series or in parallel). EX1014 ['215 Provisional], Figs. 4-21 (same)
[1.c] the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;	EX1014 ['215 Provisional], [Para 21] (“Individual LED circuits being the same or different colors ...”).
[1.d] a switch capable of at least one of:	EX1018 ['597 PCT Application], [Para 15] (“This invention comprises circuits and devices that can be driven with more than one AC or DC forward voltage ‘multivoltage’ at 6V or greater based on a <i>selectable desired operating voltage level</i> that is achieved by electrically connecting the LED circuits in a series or parallel circuit configuration and/or more than one level of brightness ‘multi-brightness’ based on a <i>switching means</i> that connects and/or disconnects at least one additional

	<p>LED circuit to and/or from a first LED circuit.”); [Para 15] (“drive voltage level ... select-ability”); [Para 16] (“means of selecting a forward voltage”); [Para 35] (“The multi-voltage and/or multi-current single chip AC LED and/or package is configured to provide a means of switching”); Figs. 7, 9.</p> <p>EX1014 [’215 Provisional], [Para 22] (“dimmer switch”), Figs. 12, 15, 19.</p>
<p>[1.e] (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or</p>	<p>EX1014 [’215 Provisional], [Para 22] (“dimmer switch that <i>regulates voltage</i> or frequency or may have integrated circuitry that allows for <i>adjustability of the otherwise relatively fixed voltage</i> and/or relatively fixed frequency output of the LED circuit driver. The LED circuits get brighter as the voltage and/or frequency of</p>

	the LED circuit driver output is increased to the LED circuits.”).
[1.f] (b) switching the at least one additional LED circuit on or off,	EX1018 [’597 PCT Application] [Para 15] (“This invention comprises circuits and devices that can be driven with more than one AC or DC forward voltage ‘multivoltage’ at 6V or greater based on a <i>selectable desired operating voltage level that is achieved by electrically connecting the LED circuits in a series or parallel circuit configuration</i> and/or ... <i>a switching means that connects and/or disconnects at least one additional LED circuit</i> to and/or from a first LED circuit.”); [Para 35] (“The multi-voltage and/or multi-current single chip AC LED and/or package is configured to provide a means of <i>switching on at least one additional single voltage AC LED circuit</i> within multi-voltage and/or multi-current

	AC LED circuit to provide increased brightness from the LED lamp.”).
[1.g] wherein (a) or (b) is selectable by a user switching the switch; and	EX1018 [’597 PCT Application], Abstract (“level selectability may be passed on through to the exterior of the LED package and may be selected by the LED package user”); [Para 15] (“the drive voltage level [] select-ability to be passed on through to the exterior of the LED package and allowing the voltage level [] to be selected at the LED package user.”).
[1.h] an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,	The ‘597 PCT application teaches the input to an LED driver may be AC. EX1018 [’597 PCT Application] [Para 7] (“With proper design considerations LEDs may be driven more efficiently with direct AC or rectified AC than with constant voltage or constant current DC drive schemes”); [Para 15] (“It would further be advantageous to provide multiple voltage

level and/or multiple brightness level light emitting LED circuits, chips, packages and lamps ‘multivoltage and/or multi-brightness LED devices’ that can easily be electrically configured for at least two forward voltage drive levels with direct AC voltage coupling, bridge rectified AC voltage coupling or constant voltage DC power source coupling.”); Fig 9 (showing bridge rectifiers receiving AC input); Fig. 10 (showing LED bridge circuit 80).

The ’597 Application teaches that its drivers can have DC outputs. EX1018 [’597 PCT Application], [Para 25] (“each multivoltage AC or DC LED device would be able to be driven with at least two different AC or DC forward voltages.”); [Para 28] (Each single voltage LED circuit is designed to be driven with

	<p>a predetermined forward voltage and preferably matching forward voltages for each circuit such as 12VDC, 24VDC, 120VDC, or other DC voltage levels for each single voltage LED circuit. Each multi-voltage and/or multi-brightness LED device would be able to be driven with at least two different DC forward voltages resulting in a first forward voltage drive level when the two single voltage LED circuits are connected in parallel and a second forward voltage drive level that is twice the level of the first forward voltage drive level when the at least two LED circuits are connected in series.”); [Para 61] (“The full wave LED bridge circuit has electrical contacts 86 to provide for AC voltage input connectivity and DC voltage output connectivity.”).</p>
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EX1014 ['215 Provisional], [Para 19]

(“The higher frequency LED circuit inverter driver may be a electronic transformer, halogen or high intensity discharge (HID) lamp type driver with design modifications for providing a relatively fixed voltage as the LED circuit load changes. Meaning if the LED circuit inverter driver is designed to have an output voltage of 12V LED circuit driver would provide this output as a relatively constant output to a load having one or more than one LED circuits up to the wattage limit of the LED circuit driver even if LED circuits were added to or removed from the output of the LED circuit driver.”).

Note the parties agree that a bridge rectifier is an LED driver and that an AC

	<p>input passed through a bridge rectifier provides a DC output. <i>See, e.g.</i> Pet., 10 (“bridge rectifiers can be used to convert AC to DC.”).</p>
<p>[1.i] wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.</p>	<p>EX1018 [’597 PCT Application] [Para 15] (“a switching means that connects and/or disconnects at least one additional LED circuit to and/or from a first LED circuit.”). Here, the switching means is directly connected to the LED circuits (and thus</p> <p>EX1014 [’215 Application], [Para 22] (“the LED circuit driver may be coupled to a dimmer switch ... that allows for adjustability of the ... output of the LED circuit driver.”).</p>
<p>2. The LED lighting system of claim 1, wherein the switch has at least two positions.</p>	<p>EX1018 [’597 PCT Application], [Para 18] (switches “switch to higher brightness levels just like 2-way or 3-way</p>

	<p>incandescent lamps”). Figs. 7 and 9 (showing “2-way switch).</p> <p>EX1014 [’215 PCT Application], [Para 22] (“dimmer switch ... allows for adjustability of the otherwise relatively fixed voltage ...”), Figs. 12 and 19 (showing “2-way switch”), Fig. 15 (showing “3-way switch”)</p>
<p>3. The LED lighting system of claim 1, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.</p>	<p>Claim 1 is directed to two different colored multi-voltage LED circuits. As discussed above, the ’597 PCT Application discloses each multi-voltage LED circuit is comprised of two or more single voltage LED circuits and each multi-voltage LED circuit has a “switching means” to switch on or off additional single voltage LED circuits. The ’597 PCT Application also discloses</p>

	<p>the “switching means” can be placed at the output of the LED driver.</p> <p>EX1014 [’215 PCT Application], [Para 22] (“dimmer switch ... allows for adjustability of the otherwise relatively fixed voltage output of the LED circuit driver. The LED circuits get brighter as the voltage and/or frequency of the LED circuit driver output is increased to the LED circuits.”).</p> <p>EX1018 [’597 PCT Application] [Para 14] (“It would further be advantageous to have a multi-voltage ... circuit that can provide options in voltage level, brightness level and/or AC or DC powering input power preference.”), [Para 15] (“It would further be advantageous to provide multiple voltage level ... light emitting LED</p>
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	<p>circuits ... that can be driven with more than one AC or DC forward voltage...”), [Para 15] (“switching means that connects and/or disconnects at least one additional LED circuit to and/or from a first LED circuit.”).</p>
<p>4. The LED lighting system of claim 1, wherein the switch, the first operating LED circuit, and the at least one additional LED circuit are mounted on a single insulating substrate.</p>	<p>EX1014 [’215 Provisional] [Para 15] (“Preferred embodiments of a package include an insulating substrate whereon the LEDs, capacitors or resistors are formed or mounted.”), [Para 12] (“Each multi-chip multi voltage AC LED package can be mounted on a printed circuit board assembly and/or other substrate”).</p> <p>EX1018 [’597 PCT Application] [Para 9] (“The LED based solid-state light emitting device or lamp is built upon an electrically insulating layer that has been formed onto a support surface of a substrate.”), [Para</p>

	<p>13] (“The art is deficient in that it does not provide a multi-voltage and/or multi-current circuit monolithically integrated on a single substrate”), [Para 24] (“at least two single voltage series LED circuits ... are formed on a single chip or substrate providing a multi-voltage AC or DC operable LED device.”), [Para 28] (“at least two single voltage LED circuits are formed on a single chip or on a substrate, and at least one bridge circuit made of LEDs is formed on the same single chip or substrate providing a multi-voltage and/or multibrightness LED device for direct DC power operation.”).</p>
<p>5. The LED lighting system of claim 1, wherein the switching of the switch changes light output of the LED lighting device.</p>	<p>EX1014 [’215 Provisional] [Para 22] (“The LED circuits get brighter as the voltage and/or frequency of the LED circuit driver output is increased to the LED circuits.”)</p>

	<p>EX1018 ['597 PCT Application] [Para 35]</p> <p>(“The multi-voltage and/or multi-current single chip AC LED and/or package is configured to provide a means of switching on at least one additional single voltage AC LED circuit within multi-voltage and/or multi-current AC LED circuit to provide increased brightness from the LED lamp.”), [Para 58] (“the brightness of the multi-brightness LED lighting device 62 can be increased and/or decreased in a fixed manner or a switching process.”).</p>
<p>6. The LED lighting system of claim 1, wherein the LED driver is configured to cause the DC voltage output to have a lower voltage than the AC voltage power source.</p>	<p>EX1014 ['215 Provisional], [Para 18]</p> <p>(“The LED circuit driver output voltage and frequency delivered to the LED circuit may be higher or lower than mains power voltage and frequencies by using an LED circuit inverter driver.”).</p>

	<p>EX1018 ['597 PCT Application], [Para. 6]</p> <p>(“LEDs ... have been driven by DC voltage sources using resistors, current regulators and voltage regulators to limit the voltage and current delivered to the LED.”).</p>
<p>7. The LED lighting system of claim 1, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit.</p>	<p>EX1014 ['215 Provisional], [Para 22]</p> <p>(“the LED circuit driver may be coupled to a dimmer switch ...”),</p> <p>EX1018 ['597 PCT Application] [Para 15]</p> <p>(“It would further be advantageous to provide multiple voltage level [] light emitting LED circuits, chips, packages and lamps [] that can easily be electrically configured for at least two forward voltage drive levels with direct AC voltage coupling, bridge rectified AC voltage coupling or constant voltage DC power</p>

	source coupling. ... This invention comprises circuits and devices that can be driven ... by electrically connecting the LED circuits [] based on a switching means that connects and/or disconnects at least one additional LED circuit to and/or from a first LED circuit.”).
[8.pre] An LED lighting system comprising:	<i>See claim [1.pre], above.</i>
[8.a] a first operating LED circuit and at least one additional LED circuit,	<i>See claim [1.a], above.</i>
[8.b] at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and	<i>See claim [1.b], above.</i>
[8.c] the at least one additional LED circuit being configured to emit a	<i>See claim [1.c], above.</i>

different color light compared to the first operating LED circuit;	
[8.d] a switch capable of at least one of:	<i>See claim [1.d], above.</i>
[8.e] (a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit, or	<i>See claim [1.e], above.</i> Increasing voltage (as in claim [1.e]) across an LED circuit will correspondingly increase brightness. <i>See, e.g.,</i> EX1014 ['215 Provisional], ¶[0022] (“The LED circuits get brighter as the voltage and/or frequency of the LED circuit driver output is increased to the LED circuits.”); EX1018 ['597 PCT Application], [Para 35] (switching on additional circuits in a multi-voltage LED circuit “provide[s] increased brightness”).
[8.f] (b) switching the at least one additional LED circuit on or off,	<i>See claim [1.f], above.</i>
[8.g] wherein (a) or (b) is selectable by a user switching the switch; and	<i>See claim [1.g], above.</i>

<p>[8.h] an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,</p>	<p><i>See claim [1.h], above.</i></p>
<p>[8.i] wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.</p>	<p><i>See claim [1.g], above.</i></p>
<p>9. The LED lighting system of claim 8, wherein the switch has at least two positions.</p>	<p><i>See claim 2, above.</i></p>
<p>10. The LED lighting system of claim 8, wherein the switching of the switch provides at least two different DC forward voltages to at</p>	<p><i>See claim 3, above.</i></p>

least one of the first operating LED circuit or the at least one additional LED circuit.	
11. The LED lighting system of claim 8, wherein the switch, the first operating LED circuit, and the at least one additional LED circuit are mounted on a single insulating substrate.	<i>See claim 4, above.</i>
12. The LED lighting system of claim 8, wherein the switching of the switch changes light output of the LED lighting device.	<i>See claim 5, above.</i>
13. The LED lighting system of claim 8, wherein the LED driver is configured to cause the DC voltage output to have a lower voltage than the AC voltage power source	<i>See claim 6, above.</i>

14. The LED lighting system of claim 8, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit.	<i>See claim 7, above.</i>
[15.pre] An LED lighting system comprising:	<i>See claim [1.pre], above.</i>
[15.a] a first operating LED circuit and at least one additional LED circuit,	<i>See claim [1.a], above.</i>
[15.b] the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;	<i>See claim [1.c], above.</i>
[15.c] a switch capable of at least one of:	<i>See claim [1.d], above.</i>
[15.d] (a) switching a voltage level input to at least one of the first	<i>See claim [1.e], above.</i>

operating LED circuit or the at least one additional LED circuit, or	
[15.e] (b) switching the at least one additional LED circuit on or off,	<i>See claim [1.f], above.</i>
[15.f] wherein (a) or (b) is selectable by switching the switch; and	<i>See claim [1.g], above.</i>
[15.g] an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,	<i>See claim [1.h], above.</i>
[15.h] wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.	<i>See claim [1.i], above.</i>

16. The LED lighting system of claim 15, wherein the switch has at least two positions.	<i>See claim 2, above.</i>
17. The LED lighting system of claim 15, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.	<i>See claim 3, above.</i>
18. The LED lighting system of claim 15, wherein the switch, the first operating LED circuit, and the at least one additional LED circuit are mounted on a single insulating substrate.	<i>See claim 4, above.</i>
19. The LED lighting system of claim 15, wherein the switching of the switch changes light output of the LED lighting device.	<i>See claim 5, above.</i>

20. The LED lighting system of claim 15, wherein the LED driver is configured to cause the DC voltage output to have a lower voltage than the AC voltage power source.	<i>See claim 6, above.</i>
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XI. GROUND 5: CLAIMS 1-2, 5, 7-9, 12, 14-16 AND 19 ARE NOT OBVIOUS OVER VAN WINKLE

181. In my opinion, Van Winkle does not qualify as prior art to the claims of the '705 Patent. Van Winkle (Ex1012) was published on July 19, 2018 and claims priority to a provisional application filed January 13, 2017. *Id.* Van Winkle, like Doheny, does not qualify art because the effective filing date for the challenged claims of the '705 Patent is at least as early as the May 28, 2010 filing date of the '597 PCT, which is nearly seven years before Van Winkle's provisional was filed. *See* §X, above. Accordingly, Ground 5 fails.

XIII. GROUND 6: CLAIMS 1-3, 5, 7-10, 12, 14-17, AND 19 ARE NOT OBVIOUS OVER BRUNING IN VIEW OF LEE

B. “Wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.”

182. As discussed above for Ground 3, Independent claims 1 and 8 require “the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.” EX1001 [’705 Patent], claims 1 and 8. Claims 1 and 8 also require the switching “is selectable by a user switching the switch.” *Id.*

183. Petitioner argues that:

In the combination, the color-specific switches of Bruning are the switch, and they are indirectly selectable by the user via the slider of Lee and the controllers. Alternatively, the combination of the color-specific switches of Bruning, the controllers, and the slider of Lee together are the switch, which is directly selected by the user.

Pet., 102-103.

184. Bruning in view of Lee does not disclose these limitations for the same reason discussed above for Ground 3—namely, Bruning’s switch (transistor) is not “selectable by a user switching the switch” and the “slider of Lee” is not “electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.” EX1001 [’705 Patent], claims 1 and 8.

C. “Wherein the switch has at least two positions”

185. Claims 2, 9 and 16 require “the switch has at least two positions.”

EX1001 [’705 Patent], claims 2, 9 and 16. Petitioner argues that “[i]n the combination, the switch includes the slider of Lee. A slider explicitly discloses at least two positions, as the user will slide the slider between multiple positions.” Pet., 103. *See id.*, 105, 107. As discussed above, Lee’s slider/knob is not electrically connected between the “DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.” Instead, this combination relies on Bruning’s transistors for that limitation. Pet., 103. But transistors have no movable positions (such as, for example, a two-way switch)—they are simply controlled to allow current to pass through. Accordingly, in my opinion, Bruning and Lee do not disclose this limitation.

XIV. CONCLUSION

186. I hereby declare that all statements made herein of my own knowledge are true and all statements made herein on information and belief were and are believed by me to be true, and that all statements herein were and are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that any such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'D A D' followed by a stylized flourish.

Alfred D. Ducharme

Dated: October 27, 2023