

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUASAR SCIENCE LLC,
Petitioner,

v.

COLT INTERNATIONAL CLOTHING, INC. d/b/a COLT LED,
Patent Owner.

IPR2023-00613
Patent 10,411,582 B1

Before CHRISTOPHER L. CRUMBLEY, ZHENYU YANG, and
ROBERT J. WEINSCHENK, *Administrative Patent Judges*.

WEINSCHENK, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Quasar Science LLC (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–3, 6–14, 16–19, 21–24, and 26–31 (“the challenged claims”) of U.S. Patent No. 10,411,582 B1 (Ex. 1001, “the ’582 patent”). Colt International Clothing, Inc. d/b/a Colt LED (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”) to the Petition.

An *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Further, a decision to institute may not institute on fewer than all claims challenged in the petition. 37 C.F.R. § 42.108(a). Here, Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one of the challenged claims is unpatentable. Patent Owner has not persuaded us that we should exercise our discretion to deny institution. Thus, we institute an *inter partes* review of the challenged claims on all the grounds of unpatentability in the Petition.

B. *Real Parties in Interest*

Petitioner identifies the following real parties in interest: 1) Quasar Science LLC; 2) Videndum Production Solutions, Inc.; 3) Videndum US Holdings Inc.; 4) Videndum Holdings, Ltd.; 5) Videndum Investments Limited; 6) Videndum Group Holdings, Ltd.; and 7) Videndum plc. Pet. 4. Patent Owner identifies itself as the only real party in interest. Paper 3, 2.

C. Related Matters

The parties indicate that the '582 patent is the subject of the following district court case: *Colt International Clothing, Inc. d/b/a Colt LED v. Quasar Science LLC*, No. 22-cv-00213 (D. Del.). Pet. 5; Paper 3, 2. Patent Owner also indicates that patents related to the '582 patent are the subject of petitions for *inter partes* review in IPR2023-00611 and IPR2023-00614. Paper 3, 2–3.

D. The '582 Patent

The '582 patent relates to “a lighting system comprising a tube light with an improved LED array capable of producing light within at least two predetermined color temperature ranges.” Ex. 1001, 1:20–23. The '582 patent states that when “accurate and suitable lighting color temperature is vital, lighting ‘gels’ are often used in conjunction with fluorescent lamps to produce the desired color temperature.” *Id.* at 2:9–12. Otherwise, “a lighting crew must continually change the fluorescent lamps between daylight white (or day white) colored lamps and tungsten (or warm white) colored lamps, or if desired, other types of white/light colored lamps.” *Id.* at 2:23–27.

According to the '582 patent, “[w]hat is desired is a lighting solution suitable for the lighting industry implementing the advantages of LED lights which allows for evenly dispersed light controllable within specific color temperature parameters without the need to physically switch out colored gels or lamp modules.” *Id.* at 3:5–10. To do so, the '582 patent describes a light system that includes “a first type of LED bulbs configured to provide a first color temperature range light and a second type of LED bulbs configured to provide a second color temperature range light.” *Id.* at 4:66–

5:5. The light system also includes circuitry “configured such that only one group of LEDs . . . can be turned on at a time.” *Id.* at 5:58–60.

E. Illustrative Claim

Of the challenged claims, claims 1, 18, and 23 are independent.

Claim 1 is reproduced below.

1. An LED light system configured for providing broad-spectrum white light suitable for a commercial image recording, in a form factor of a fluorescent light tube lamp, the LED light system comprising:

a housing having ends and including a support structure in a form of an elongated and narrow surface having a top side and a bottom side;

a plurality of first LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a first predetermined Kelvin temperature range of cool white light;

a plurality of second LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a second predetermined Kelvin temperature range of warm white light;

electronic circuitry mounted to the support structure including an LED driver circuit configured for selectively electronically switching between driving either (i) the first LEDs, to provide light while the second LEDs are off; or (ii) the second LEDs, to provide light while the first LEDs are off, wherein the first and second predetermined Kelvin temperature ranges are nonoverlapping, and including a printed circuit board mounted to the support structure for carrying electrical power from a connection to the LED driver circuit and then to the first and second LEDs; and

an elongate cover extending substantially a length of the support structure and covering the top side of the support structure for diffusing light emitted by the first and second LEDs; and

wherein the housing and cover together have a linear form factor of a fluorescent light tube lamp having a diameter of no greater than approximately 41 mm,

wherein the LED light system is configured for receiving input power to be provided to the LED driver circuit to selectively light the first or second LEDs, and

wherein the first and second LEDs are disposed in a plurality of rows distributed along the length of the top side of the support structure to emit light, when selectively lit by the LED driver circuit, along the length of the top side of the support structure,

wherein the light is diffused by the cover and is suitable for the commercial image recording both when the emitted light from the LED light system is in the first temperature range of cool white light and when the emitted light from the LED light system is in the second temperature range of warm white light,

wherein the light emitted from the LED light system is said suitable for the commercial image recording when said emitted light: (i) is at least 1000 lumens when the first LEDs are lit and is also at least 1000 lumens when the second LEDs are lit; (ii) is broad-spectrum white light having a color deviation corresponding to less than five points of green and less than five points of magenta (5M, 5G) of color compensation (CC), and (iii) has a color rendering index of light emitted from each of the first LEDs or each of the second LEDs, whichever respective plurality of first or second LEDs is lit, that is greater than 90.

Ex. 1001, 12:4–62.

F. Evidence

Petitioner submits the following evidence:

Evidence	Exhibit No.
Declaration of Fred Holmes (“Holmes Declaration”)	1003
Kit, US 7,507,001 B2, issued Mar. 24, 2009 (“Kit”)	1004

Evidence	Exhibit No.
Ducharme, US 7,350,936 B2, issued Apr. 1, 2008 (“Ducharme”)	1005
Katzir, US 2010/0102729 A1, published Apr. 29, 2010 (“Katzir”)	1006
Ianiro, WO 2009/063520 A1, published May 22, 2009 (“Ianiro”)	1007
Hasnain, US 8,668,361 B2, issued Mar. 11, 2014 (“Hasnain”)	1008

G. Asserted Grounds

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 6–14, 16–19, 21–24, 26–31	103	Kit, Ianiro, Ducharme, Katzir
1–3, 6–14, 16–19, 21–24, 26–31	103	Ducharme, Ianiro, Katzir, Hasnain

II. ANALYSIS

A. 35 U.S.C. § 325(d)

Patent Owner argues that the Petition should be denied under 35 U.S.C. § 325(d). Prelim. Resp. 14–37. In determining whether to deny institution under § 325(d), we use

the following two-part framework: (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of the first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential).

1. *Whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office*

Under the first part of the *Advanced Bionics* framework, we consider “whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office.” *Id.* Patent Owner argues that Petitioner relies on art and arguments that are the same as, or cumulative of, art and arguments previously presented the Office. Prelim. Resp. 15–34. For purposes of this Decision, we need not decide whether the same or substantially the same art or arguments previously were presented to the Office. As discussed below, even if we assume that the first part of the *Advanced Bionics* framework is satisfied, Petitioner demonstrates that the Office erred in a manner material to the patentability of the challenged claims.

2. *Whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims*

Under the second part of the *Advanced Bionics* framework, we consider “whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.” *Advanced Bionics*, Paper 6 at 8. “An example of a material error may include misapprehending or overlooking specific teachings of the relevant prior art where those teachings impact patentability of the challenged claims.” *Id.* at 8 n.9.

Patent Owner argues that “the Petition fails to make any substantive attempt to demonstrate that the Office erred in any way.” Prelim. Resp. 35.

We disagree. During examination of the '582 patent, the Examiner allowed the pending independent claims over “Katziret al. (US2010/0102729) and Pohlert et al. (US 2003/0072156).” Ex. 1002, 774. Specifically, the Examiner stated that those references

lack the teachings of the emitted light being suitable for the commercial image recording when the emitted light is simultaneously at least 1000 lumens when either the first LEDs or the second LEDs are lit, is broad-spectrum white light having a color deviation corresponding to less than five points of both green and magenta of color compensation, and has a color rendering index of light emitted from each of the first LEDs or the second LEDs (whichever is lit) that is greater than 90.

Id.

On this record, Petitioner demonstrates that the Examiner overlooked Ducharme’s teachings of the limitations that were the basis for allowing the challenged claims. As discussed in more detail below, Petitioner’s evidence indicates that Ducharme teaches an LED light suitable for commercial image recording that includes a plurality of first white LEDs having a first spectrum and a plurality of second white LEDs having a second spectrum. *See, e.g.*, Pet. 52, 55; Ex. 1005, 4:1–7 (“film and television producers”), 33:63–67 (“at least one first white LED . . . having a first spectrum . . . at least one second LED . . . having a second spectrum”). Petitioner’s evidence also indicates that a person of ordinary skill in the art would have had reason to select first white LEDs with a daylight spectrum and second white LEDs with a tungsten spectrum. Pet. 55–56; Ex. 1003 ¶ 462; Ex. 1006 ¶ 53 (“daylight spectrum LEDs . . . tungsten spectrum LEDs”). Further, Petitioner’s evidence indicates that LEDs satisfying the light quality parameters recited in the challenged claims were known to those of ordinary

skill in the art. Pet. 61–63; Ex. 1001, 11:39–47; Ex. 1003 ¶ 487; Ex. 1005, 25:36–43; Ex. 1007, 7:11–15; Ex. 1008, 4:1–3.

As a result, on this record, Petitioner demonstrates that the Office erred in a manner material to the patentability of challenged claims.

3. *Summary*

For the reasons discussed above, we decline to exercise our discretion under § 325(d) to deny the Petition.

B. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art would have had “at least a Bachelor of Science degree in electrical engineering, or a closely related field, along with at least two years of experience in the design of entertaining lighting systems, and the design and use of LED lights.” Pet. 13 (citing Ex. 1003 ¶ 32). Petitioner’s description of the level of ordinary skill in the art is supported by the testimony of Petitioner’s declarant, Mr. Fred Holmes. Ex. 1003 ¶ 32. Patent Owner does not dispute Petitioner’s description at this stage of the proceeding. Prelim. Resp. 12. We adopt Petitioner’s description for purposes of this Decision.

C. Claim Construction

In an *inter partes* review proceeding, a patent claim is construed using the same standard used in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of the claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b). Neither party proposes an express construction for any claim terms at this stage of the proceeding. Pet. 13; Prelim. Resp. 12–14. We determine that no claim terms require express construction for purposes of this Decision.

D. Obviousness of Claims 1–3, 6–14, 16–19, 21–24, and 26–31 over Kit, Ianiro, Ducharme, and Katzir

Petitioner argues that claims 1–3, 6–14, 16–19, 21–24, and 26–31 would have been obvious over Kit, Ianiro, Ducharme, and Katzir. Pet. 14–47. Because we determine below that Petitioner demonstrates a reasonable likelihood of prevailing on its other asserted ground based on Ducharme, Ianiro, Katzir, and Hasnain, we also institute an *inter partes* review on this asserted ground. See Consolidated Trial Practice Guide, 64 (Nov. 2019), available at <https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf> (“TPG”). Nonetheless, we provide a preliminary analysis of the parties’ arguments regarding this asserted ground “to provide guidance to the parties for the upcoming trial.” *Id.*

Claim 1 recites “a plurality of first LEDs . . . configured to emit broad-spectrum white light in a first predetermined Kelvin temperature range of cool white light,” and “a plurality of second LEDs . . . configured to emit broad-spectrum white light in a second predetermined Kelvin temperature range of warm white light.” Ex. 1001, 12:11–18. The other challenged independent claims recite similar limitations. *Id.* at 14:4–11, 15:31–38. Petitioner argues that Kit teaches a “plurality of LED arrays . . . configured to emit broad-spectrum white light in various predetermined Kelvin temperature ranges, including cool and warm white light.” Pet. 23 (citing Ex. 1004, 3:20–38, 22:9–35). Patent Owner contends that “Kit lacks any disclosure of a bicolor luminaire with cool white and warm white LEDs.” Prelim. Resp. 40. According to Patent Owner, Kit teaches “matching LEDs to get a consistent color temperature output,” not providing “both warm white and cool white in one luminaire.” *Id.*

On this record, we agree with Patent Owner. The first portion of Kit cited by Petitioner states the following:

The solution to the wide manufacturing tolerances for achieving a consistent color temperature and intensity was to introduce color-matched white Luxeon Lamps, each containing multiple white Luxeon LEDs that are selected by advanced binning algorithms. By correctly combining an appropriate mix of LEDs, the Luxeon Lamps themselves have well-controlled and consistent color temperatures of 3200K (warm white), 4100K (commercial white) or 5500K (cool white).

Ex. 1004, 3:28–36. Petitioner does not explain specifically how this portion of Kit teaches a light having both cool white LEDs and warm white LEDs. *See* Pet. 23–24. To the contrary, this portion of Kit appears to address the problem of “wide manufacturing tolerances” by providing a light with “an appropriate mix of LEDs” that produce a single, consistent temperature of either warm white, commercial white, or cool white. Ex. 1004, 3:28–36. The other portion of Kit cited by Petitioner teaches an “arrangement” with “a combination” of “white color LEDs” and “yellow or amber color LEDs.” *Id.* at 22:21–25. But, again, Petitioner does not explain specifically how this portion of Kit teaches a light having both cool white LEDs and warm white LEDs. *See* Pet. 23–24.

Petitioner also argues that “Katzir further discloses daylight and tungsten temperature ranges within the claimed temperature ranges.” Pet. 24 (citing Ex. 1006 ¶¶ 53–54, Figs. 5A–5B). According to Petitioner, “Katzir discloses various LED array layouts that a POSITA would have looked to when designing an LED tube lighting like that disclosed in Kit.” *Id.* at 18–19 (citing Ex. 1003 ¶ 102). Patent Owner contends that Petitioner’s asserted reason for combining the cited teachings of Kit and Katzir “is insufficient.” Prelim. Resp. 48.

On this record, we agree with Patent Owner. Even if Petitioner is correct that Katzir teaches a light with both cool white LEDs and warm white LEDs, on this record, Petitioner does not show sufficiently that it would have been obvious to combine that specific teaching of Katzir with Kit. *See* Pet. 18–19, 24. As discussed above, Kit appears to teach a light with “an appropriate mix of LEDs” that produce a single, consistent temperature of either warm white, commercial white, or cool white. Ex. 1004, 3:28–36. Petitioner does not explain specifically *why* a person of ordinary skill in the art would have modified Kit to include Katzir’s particular layout that includes both cool white LEDs and warm white LEDs. *See* Pet. 18–19, 24; Ex. 1003 ¶ 102.

Nonetheless, as discussed below, because we determine that Petitioner demonstrates a reasonable likelihood of prevailing on the other asserted ground based on Ducharme, Ianiro, Katzir, and Hasnain, we also institute an *inter partes* review on this asserted ground. Patent Owner may raise its arguments regarding this asserted ground again in its response to the Petition after institution.

E. Obviousness of Claims 1–3, 6–14, 16–19, 21–24, and 26–31 over Ducharme, Ianiro, Katzir, and Hasnain

Petitioner argues that claims 1–3, 6–14, 16–19, 21–24, and 26–31 would have been obvious over Ducharme, Ianiro, Katzir, and Hasnain. Pet. 47–75. For the reasons discussed below, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 1–3, 6–14, 16–19, 21–24, and 26–31 would have been obvious over Ducharme, Ianiro, Katzir, and Hasnain.

1. Claim 1

Claim 1 recites “[a]n LED light system configured for providing broad-spectrum white light suitable for a commercial image recording, in a form factor of a fluorescent light tube lamp.” Ex. 1001, 12:4–7. Petitioner presents evidence that Ducharme teaches an LED light for providing white light in a form factor of a fluorescent light. Pet. 51–52 (citing Ex. 1005, 5:7–33, 29:16–55, Fig. 29). Petitioner also presents evidence that Ducharme’s LED light is suitable for commercial image recording.¹ *Id.* at 52 (citing Ex. 1005, 4:1–7, 14:30–32, 18:51–64, 19:14–24, 19:62–65, 31:51–54, 32:11–13, 32:44–45). On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches the preamble of claim 1.²

Claim 1 recites “a housing having ends and including a support structure in a form of an elongated and narrow surface having a top side and a bottom side.” Ex. 1001, 12:8–10. Petitioner presents evidence that Ducharme teaches a housing having ends and including an elongated and narrow support structure with a top side and a bottom side. Pet. 52–53 (citing Ex. 1005, 5:7–33, 12:49–53, 29:16–60, Figs. 5a, 5b, 29). On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches this limitation of claim 1.

¹ We address Patent Owner’s arguments regarding the phrase “suitable for a commercial image recording” below.

² Because Petitioner presents evidence that the prior art teaches the recitations in the preamble of claim 1, at this stage of the proceeding, we need not decide whether the preamble is limiting.

Claim 1 recites “a plurality of first LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a first predetermined Kelvin temperature range of cool white light,” and “a plurality of second LEDs mounted on the top side of the support structure and configured to emit broad-spectrum white light in a second predetermined Kelvin temperature range of warm white light.” Ex. 1001, 12:11–18. Petitioner presents evidence that Ducharme teaches a plurality of first white LEDs and a plurality of second white LEDs. Pet. 54–55 (citing Ex. 1005, 5:47–50, 13:60–64, 33:63–67). Petitioner also presents evidence that a person of ordinary skill in the art would have known that “daylight and tungsten color temperature ranges are used in the lighting industry for stage and set lighting,” and thus would have had reason to select first white LEDs with a daylight temperature and second white LEDs with a tungsten temperature. *Id.* at 55–56 (citing Ex. 1003 ¶¶ 452–453, 461–462).

Patent Owner contends that Petitioner does not show sufficiently that Ducharme teaches a plurality of first white LEDs having a cool white temperature range and a plurality of second white LEDs having a warm white temperature range. Prelim. Resp. 45–47. Specifically, Patent Owner argues that Ducharme does not teach “a bicolor luminaire using daylight white and tungsten white,” but instead teaches a luminaire having a first white LED with a “first spectrum” and a second LED with a “different spectrum.” *Id.* at 45–46 (citing Ex. 1005, 13:60–14:3, 33:63–67). According to Patent Owner, “spectrum is a wavelength which would determine color, not color temperature,” and thus “the second LED . . . would be a color.” *Id.* at 46 (emphasis omitted).

On this record, Patent Owner’s argument is unavailing. Ducharme teaches “at least one first white LED . . . having a first spectrum,” and “at least one second LED . . . having a second spectrum different than the first spectrum.” Ex. 1005, 33:63–67. We disagree with Patent Owner’s argument that this teaching of Ducharme is limited to first white LEDs and second non-white LEDs. The evidence of record indicates that two white LEDs may have different spectrums. For example, the evidence of record indicates that white LEDs may be “daylight spectrum LEDs” or “tungsten spectrum LEDs.” Pet. 56; Ex. 1006 ¶ 53. Thus, contrary to Patent Owner’s assertion, Ducharme’s teaching of “at least one first white LED . . . having a first spectrum” and “at least one second LED . . . having a second spectrum different than the first spectrum” includes first white LEDs having a daylight spectrum and second white LEDs having a tungsten spectrum. Pet. 55; Ex. 1005, 33:63–67. And, as discussed above, Petitioner presents evidence indicating that a person of ordinary skill in the art would have had reason to select those specific spectrums. Pet. 55; Ex. 1003 ¶¶ 453, 462.

Claim 1 recites

electronic circuitry mounted to the support structure including an LED driver circuit configured for selectively electronically switching between driving either (i) the first LEDs, to provide light while the second LEDs are off; or (ii) the second LEDs, to provide light while the first LEDs are off, wherein the first and second predetermined Kelvin temperature ranges are nonoverlapping, and including a printed circuit board mounted to the support structure for carrying electrical power from a connection to the LED driver circuit and then to the first and second LEDs.

Ex. 1001, 12:19–29. Petitioner presents evidence that Ducharme teaches a processor for individually controlling the intensities of the first and second

LEDs. Pet. 54 (citing Ex. 1005, 10:43–63, 13:60–14:28, 24:45–25:2); *id.* at 56–57 (citing Ex. 1005, 29:47–51, 30:24–26, Fig. 29). On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches this limitation of claim 1.

Claim 1 recites “an elongate cover extending substantially a length of the support structure and covering the top side of the support structure for diffusing light emitted by the first and second LEDs.” Ex. 1001, 12:30–33. Petitioner presents evidence that Ducharme teaches a cover comprising a filter that diffuses light emitted by the first and second LEDs. Pet. 57–58 (citing Ex. 1005, 12:3–15, 29:27–30, Fig. 29). On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches this limitation of claim 1.

Claim 1 recites “wherein the housing and cover together have a linear form factor of a fluorescent light tube lamp having a diameter of no greater than approximately 41 mm.” Ex. 1001, 12:34–36. Petitioner presents evidence that Ducharme’s housing has a linear form factor of a fluorescent light. Pet. 58 (citing Ex. 1005, 29:15–55, Figs. 5a, 29). Petitioner also presents evidence that Katzir teaches an LED light “placed in a linear form factor of a T8 or T12 fluorescent light,” and that a person of ordinary skill in the art would have known “that a standard T12 fluorescent tube would have a diameter of approximately 1.5 inches (less than 41 mm).” *Id.* at 58–59 (citing Ex. 1003 ¶¶ 475; Ex. 1006 ¶¶ 13, 27). As discussed in detail below, Petitioner presents evidence that it would have been obvious to implement Ducharme’s LED light using Katzir’s form factor. *Id.* at 50–51 (citing Ex. 1003 ¶¶ 436–440). On this record, Petitioner shows sufficiently that the

Ducharme, Ianiro, Katzir, and Hasnain combination teaches this limitation of claim 1.

Claim 1 recites “wherein the LED light system is configured for receiving input power to be provided to the LED driver circuit to selectively light the first or second LEDs.” Ex. 1001, 12:37–39. Petitioner presents evidence that Ducharme teaches separately providing power to the first or second LEDs. Pet. 59 (citing Ex. 1005, 12:17–35, 16:27–52, 24:45–25:2, 29:15–55, Fig. 29). On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches this limitation of claim 1.

Claim 1 recites “wherein the first and second LEDs are disposed in a plurality of rows distributed along the length of the top side of the support structure to emit light, when selectively lit by the LED driver circuit, along the length of the top side of the support structure.” Ex. 1001, 12:40–44. Petitioner presents evidence that Ducharme teaches disposing the first and second LEDs in multiple strips along the support structure. Pet. 59 (citing Ex. 1005, 12:17–35, 16:27–52, 24:45–25:2, 29:15–55, Fig. 29). On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches this limitation of claim 1.

Claim 1 recites “wherein the light is diffused by the cover and is suitable for the commercial image recording both when the emitted light from the LED light system is in the first temperature range of cool white light and when the emitted light from the LED light system is in the second temperature range of warm white light.” Ex. 1001, 12:45–50. Petitioner presents evidence that Ducharme’s cover comprises a filter that diffuses light emitted by the first and second LEDs. Pet. 60 (citing Ex. 1005, 12:3–

15, 29:15–55, Fig. 29). Petitioner also presents evidence that Ducharme’s LED light is suitable for commercial image recording.³ *Id.* (citing Ex. 1005, 26:5–28, 30:23–34, Fig. 18). On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches this limitation of claim 1.

Claim 1 recites

wherein the light emitted from the LED light system is said suitable for the commercial image recording when said emitted light: (i) is at least 1000 lumens when the first LEDs are lit and is also at least 1000 lumens when the second LEDs are lit; (ii) is broad-spectrum white light having a color deviation corresponding to less than five points of green and less than five points of magenta (5M, 5G) of color compensation (CC), and (iii) has a color rendering index of light emitted from each of the first LEDs or each of the second LEDs, whichever respective plurality of first or second LEDs is lit, that is greater than 90.

Ex. 1001, 12:51–62. Petitioner presents evidence that Hasnain teaches LEDs suitable for generating at least 1000 lumens when either the first or second LEDs are on. Pet. 62–63 (citing Ex. 1003 ¶ 490; Ex. 1008, 4:2–3, 4:37–43). Petitioner presents evidence that Ianiro teaches LEDs that produce broad-spectrum white light with a color deviation corresponding to less than five points of green and less than five points of magenta of color compensation. *Id.* at 63 (citing Ex. 1007, 7:11–15). Petitioner presents evidence that Ducharme teaches LEDs with a color rendering index (“CRI”) greater than 90. *Id.* at 61 (citing Ex. 1005, 4:1–5, 25:36–43). And, as discussed in detail below, Petitioner presents evidence that it would have

³ We address Patent Owner’s arguments regarding the phrase “suitable for the commercial image recording” below.

been obvious to combine the cited teachings of Ducharme, Ianiro, and Hasnain to provide an LED light suitable for commercial image recording. *Id.* at 47–50 (citing Ex. 1003 ¶¶ 417–435).

Patent Owner contends that Petitioner does not show sufficiently that Ducharme teaches LEDs that emit broad-spectrum white light with a CRI greater than 90. Prelim. Resp. 43–45. Specifically, Patent Owner argues that Ducharme “teaches a way to get higher CRI,” but does so with “three different colored LEDs, rather than broad-spectrum white light.” *Id.* at 44 (citing Ex. 1005, 24:9–50, 25:16–20, 25:35–43, 28:18–25) (emphasis omitted). On this record, Patent Owner’s argument is unavailing. Ducharme teaches generally that LEDs with a CRI greater than 90 provide high quality light. Pet. 61; Ex. 1005, 25:41–42. Even if Patent Owner is correct that Ducharme uses different colored LEDs to achieve that CRI, the evidence of record indicates that broad-spectrum white LEDs with a CRI greater than 90 also were known to those of ordinary skill in the art. Pet. 61–62; Ex. 1003 ¶ 487 (“LEDs of the time were capable of functioning at these parameters.”); Ex. 1007, 2:25–3:3 (“CRI can reach the value 100.”).

Patent Owner contends that Petitioner does not show sufficiently that Hasnain teaches LEDs that are suitable for generating at least 1000 lumens and also satisfy the claimed “parameters of the CRI, the green – magenta deviations, or the color temperature.” Prelim. Resp. 56 (citing Ex. 1008, 4:1–3). According to Patent Owner, Hasnain “might cause a POSITA to investigate higher output LEDs, but there is no basis to say that such LEDs would be sufficient quality for film industry use.” *Id.* On this record, Patent Owner’s argument is unavailing. Even if Patent Owner is correct that Hasnain alone does not teach LEDs that satisfy all the claimed light quality

parameters, Petitioner presents evidence that it would have been obvious to combine the cited teachings of Ducharme, Ianiro, and Hasnain to select LEDs that satisfy the parameters recited in claim 1. Pet. 47–50, 61; Ex. 1003 ¶¶ 417–435, 487 (“LEDs of the time were capable of functioning at these parameters.”).

Patent Owner contends that Petitioner does not show sufficiently that Hasnain teaches LEDs that are suitable for generating at least 1000 lumens and also are disposed in a plurality of rows along the support structure. Prelim. Resp. 56. Patent Owner contends that “to make use of the[] 70 to 100 lm/W LEDs, Hasnain teaches that the LEDs are spaced one to two inches apart in a line” and thus “would lack the multiple rows of LEDs recited in claim 1.” *Id.* (citing Ex. 1008, 6:38–43) (emphasis omitted). On this record, Patent Owner’s argument is unavailing. The cited portion of Hasnain states that “[i]n one aspect of the present invention, the dies are separated by one to two inches.” Ex. 1008, 6:38–43. But that portion of Hasnain does not indicate that such spacing is required for Hasnain’s LEDs. *See id.* Further, Patent Owner misinterprets Petitioner’s proposed combination. Petitioner does not propose modifying Ducharme to include Hasnain’s spacing of LEDs. *See* Pet. 50, 62–63; Ex. 1003 ¶ 434. Rather, as discussed above, Petitioner proposes implementing Ducharme’s light (which includes a plurality of rows of LEDs) using an LED with Hasnain’s lumen output. Pet. 50, 59, 62–63; Ex. 1003 ¶ 434; Ex. 1005, 29:39–42.

For the foregoing reasons, on this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches the limitations of claim 1.

2. Claims 2, 3, 6–14, 16–19, 21–24, and 26–31

Independent claims 18 and 23 recite limitations similar to those discussed above for claim 1. Ex. 1001, 13:64–15:7, 15:24–16:34. Dependent claims 2, 3, 6–14, 16, 17, 19, 21, 22, 24, and 26–31 depend, directly or indirectly, from claims 1, 18, or 23. *Id.* at 12:63–13:2, 13:15–51, 13:56–63, 15:8–9, 15:15–23, 16:35–36, 16:42–64. Petitioner presents evidence that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches the limitations of claims 2, 3, 6–14, 16–19, 21–24, and 26–31. Pet. 64–75. Other than the arguments discussed above for claim 1, Patent Owner does not dispute that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches the limitations of claims 2, 3, 6–14, 16–19, 21–24, and 26–31. Prelim. Resp. 56–58. On this record, Petitioner shows sufficiently that the Ducharme, Ianiro, Katzir, and Hasnain combination teaches the limitations of claims 2, 3, 6–14, 16–19, 21–24, and 26–31.

3. Reason to Combine

Petitioner argues that a person of ordinary skill in the art would have had reason to combine the cited teachings of Ducharme and Katzir. Pet. 50–51 (citing Ex. 1003 ¶¶ 436–437). In particular, Petitioner presents evidence that Ducharme and Katzir both teach an LED light that uses a fluorescent tube form factor. *Id.* at 47, 50 (citing Ex. 1005, 28:53–65; Ex. 1006 ¶ 27). Thus, according to Petitioner, a person of ordinary skill in the art would have been guided by Katzir to implement Ducharme’s LED light using Katzir’s specific T8 or T12 fluorescent tube form factor. *Id.* at 50–51 (citing Ex. 1003 ¶¶ 436–437).

Petitioner also argues that a person of ordinary skill in the art would have had reason to combine the cited teachings of Ducharme, Ianiro, and

Hasnain. *Id.* at 47–50 (citing Ex. 1003 ¶¶ 417–435). Specifically, Petitioner presents evidence that Ducharme teaches an LED light for providing “high quality white lighting.” *Id.* at 49 (citing Ex. 1005, 25:36–43). Petitioner also presents evidence that in order to provide such high quality white lighting, a person of ordinary skill in the art would have been motivated to implement Ducharme’s LED light using LEDs with high lumen output, as taught by Hasnain, and a specific green and magenta color compensation, as taught by Ianiro. *Id.* at 49–50 (citing Ex. 1003 ¶¶ 430–433).

Patent Owner contends that Petitioner does not show sufficiently that it would have been obvious to combine Ducharme and Katzir. Prelim. Resp. 47–50. Patent Owner argues that Ducharme’s teachings are “in conflict” with Katzir because Ducharme uses “multiple different colored LEDs with narrow band width,” whereas Katzir uses “disparate color temperature white LEDs and blend[s] them.” *Id.* at 49. Patent Owner also argues that Ducharme “teaches the need for an accurate color temperature,” and thus a person of ordinary skill in the art “would be much more likely to forego Katzir’s disparate color blending luminaire,” as it would “make accurate color temperature rendition difficult.” *Id.* at 49–50.

On this record, Patent Owner’s argument is unavailing. As discussed above, we are not persuaded that Ducharme is limited to different colored narrow bandwidth LEDs. In addition, Patent Owner misinterprets Petitioner’s proposed combination. Petitioner does not propose modifying Ducharme to include Katzir’s blending of two LEDs with different color temperatures. *See* Pet. 50–51; Ex. 1003 ¶¶ 436–437. Rather, as discussed above, Petitioner only proposes implementing Ducharme’s LED light using

Katzir’s specific T8 or T12 fluorescent tube form factor. Pet. 50–51; Ex. 1003 ¶¶ 436–437.

Patent Owner contends that Petitioner does not show sufficiently that it would have been obvious to combine Ducharme and Ianiro. Prelim. Resp. 42–43. Patent Owner argues that “Ianiro mentions CRI and use of a luminaire in the film industry, but says that CRI is not so important.” *Id.* (citing Ex. 1007, 7:6–15). Thus, according to Patent Owner, “a POSITA consulting Ianiro would be satisfied with a lower CRI and not seek one over . . . 90.” *Id.* at 43.

On this record, Patent Owner’s argument is unavailing. The evidence of record indicates that LEDs with a high CRI emit “high quality” light and are “desirable” in certain applications. Pet. 61–62; Ex. 1005, 25:41–42; Ex. 1007, 2:25–3:3. The portion of Ianiro cited by Patent Owner states that “it has been deemed appropriate to adapt the emission to the specific sector of interest (photo-film-television shooting) by resorting not so much to the CRI index . . . but by making uniform and correlating the light response to the traditional chromatic measurement of the color temperature.” Ex. 1007, 7:4–10. Even if Ianiro “expresses a general preference” for an alternative to LEDs with a high CRI, the cited portion of Ianiro does not criticize, discredit, or otherwise discourage investigation into LEDs with a CRI greater than 90. *See id.*; *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017). Thus, on this record, we are not persuaded that Ianiro teaches away from LEDs with a CRI greater than 90.

Patent Owner also contends that Petitioner does not show sufficiently that a person of ordinary skill in the art would have had a reasonable expectation of success in combining Ducharme, Ianiro, Katzir, and Hasnain.

Prelim. Resp. 50–55. First, Patent Owner argues that it would have been a “difficult challenge” to design a light that generates at least 1000 lumens when only the cool white LEDs are on and when only the warm white LEDs are on. *Id.* at 52. On this record, Patent Owner’s argument is unavailing. Patent Owner does not identify specific evidence to support its assertion that such a design would have been “difficult.” *See id.* In contrast, Petitioner presents evidence indicating that a person of ordinary skill in the art would have been able to produce the claimed lumen output using existing LEDs. Pet. 62–63; Ex. 1003 ¶ 490; Ex. 1008, 4:2–3, 4:37–43.

Second, Patent Owner argues that “there is a lumen penalty (reduction in output)” for 1) “warm white color temperature LEDs”; 2) “reducing green tones in LED output”; and 3) “higher CRI.” Prelim. Resp. 53–54. Thus, according to Patent Owner, a person of ordinary skill in the art would not have selected “broad-spectrum white LEDs in the cool white and warm white temperatures, especially if trying to minimize green – magenta color deviation, trying to maximize CRI and trying to get 1000 lumens out of only half of the LEDs.” *Id.* at 54. On this record, Patent Owner’s argument is unavailing. Even if Patent Owner is correct that the claimed light quality parameters would have reduced the lumen output of an individual LED, the evidence of record indicates that a person of ordinary skill would have had a reasonable expectation of designing a light with enough LEDs to generate 1000 lumens. *See* Prelim. Resp. 1 (acknowledging that the ’582 patent does not purport to invent “any special LED chips.”); Ex. 1003 ¶ 487 (“LEDs of the time were capable of functioning at these parameters.”).

4. *Summary*

For the foregoing reasons, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 1–3, 6–14, 16–19, 21–24, and 26–31 would have been obvious over Ducharme, Ianiro, Katzir, and Hasnain.

III. CONCLUSION

Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one of the challenged claims is unpatentable. Accordingly, we institute an *inter partes* review on all grounds of unpatentability in the Petition. At this stage of the proceeding, we have not made a final determination with respect to the patentability of any of the challenged claims.

IV. ORDER

It is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–3, 6–14, 16–19, 21–24, and 26–31 of the '582 patent is instituted with respect to all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '582 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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