

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WANGS ALLIANCE CORPORATION d/b/a WAC LIGHTING CO.,
Petitioner,

v.

KONINKLIJKE PHILIPS N.V.,
Patent Owner.

Case IPR2015-01290
Patent 6,250,774 B1

Before, GLENN J. PERRY, TREVOR M. JEFFERSON, and
MIRIAM L. QUINN, *Administrative Patent Judges*.

QUINN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

Wangs Alliance Corporation (“Petitioner”) filed a Petition to institute *inter partes* review of claims 1, 3, 5, and 14 of U.S. Patent No. 6,250,774 B1 (“the ’774 patent”) pursuant to 35 U.S.C. § 311–319. Paper 2 (“Pet.”). Koninklijke Philips N.V. (“Patent Owner”) timely filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). Upon consideration of the Petition and the Preliminary Response, we instituted trial as to all challenged claims. Paper 9 (“Dec.”).

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 28, “PO Resp.”); and Petitioner filed a Reply (Paper 37, “Reply”). Patent Owner also filed Motions for Observations on Cross Examination of Petitioner’s Reply Witness Dr. Bretschneider. (Paper 54, “Mot. for Obs.”). Petitioner responded to Patent Owner’s Motion for Observations. (Paper 58, “Resp. Obs.”). Petitioner also filed a Motion to Exclude (Paper 48, “Mot. to Exclude”), which Patent Owner opposes (Paper 53, “Opp. Mot. to Exclude”).¹

An oral hearing was held on August 24, 2016.²

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons discussed herein, and in view of the record in this trial, we determine that Petitioner has not shown by a preponderance of the evidence that claims 1, 3, 5, and 14 of the ’774 patent are unpatentable.

¹ Petitioner also filed a Reply in support of its Motion to Exclude. Paper 57 (“Reply Mot. to Exclude”).

² A transcript of the oral hearing is entered in the record as Paper 61 (“Tr.”).

I. BACKGROUND

A. RELATED MATTERS

Petitioner states that the patent-at-issue is the subject matter of a district court case filed in the U.S. District Court for the District of Massachusetts (Case No. 14-cv-12298-DJC). Pet. 1.

B. INSTITUTED GROUNDS OF UNPATENTABILITY

We instituted trial based on the following ground (Dec. 11):

Reference[s]	Basis	Claims challenged
Turnbull ³ and Kish ⁴	§ 103	1, 3, 5, and 14

A. THE '774 PATENT (EX. 1001)

The '774 patent is directed to a luminaire comprising multiple lighting units, each lighting unit having a light emitting diode (“LED”) chip and an optical system for use in a variety of applications, such as street lighting, spotlighting, or floodlighting. Ex. 1001, 1:33–40, 1:57–62.

Figure 2 of the '774 patent illustrates one view of one embodiment of luminaire 1. *See id.* at 5:36–37.

³ U.S. Patent No. 5,803,579 (Exhibit 1003) (“Turnbull”).

⁴ Kish, F.A., et al., *High Luminous Flux Semiconductor Wafer-Bonded AlGaInP/GaP Large-Area Emitters*, 30 (21) Elecs. Letters 1790 (Oct. 13, 1994) (Exhibit 1004) (“Kish”).

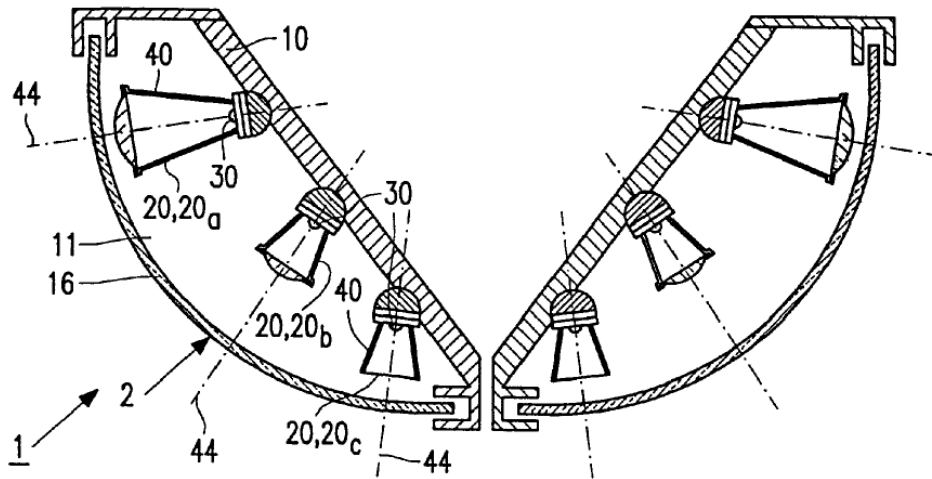


FIG. 2

Lighting module 2 comprises a set of lighting units 20, each comprising LED chip 30 and optical system 40 cooperating with said chip. *Id.* at 5:51–53. LED chips 30 each supply a luminous flux of at least 5 lm. *Id.* at 5:56–57.

B. ILLUSTRATIVE CLAIM

Claim 1 is illustrative of the claimed subject matter, and is reproduced below.

1. A luminaire comprising a housing with a light emission window, at least one lighting module in said housing for illuminating an object outside said housing, the lighting module comprising a set of lighting units, each of said lighting units comprising at least one LED chip and an optical system configured to illuminate portions of the object during operation, each said LED chip supplying a luminous flux of at least 5 lm during operation.

II. ANALYSIS

A. CLAIM INTERPRETATION

The Board interprets claims using the “broadest reasonable construction in light of the specification of the patent in which [they] appear[.]” 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–43 (2016). We presume that claim terms have their ordinary and customary meaning. See *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007) (“The ordinary and customary meaning is the meaning that the term would have to a person of ordinary skill in the art in question.”).

In our Decision on Institution, we did not construe expressly any terms. Dec. 4 (agreeing with Patent Owner that the construction of proposed terms was not needed to determine whether to grant or deny the Petition). We noted, however that Petitioner proposed constructions of three terms as follows. Dec. 4 (citing Pet. 5–6).

Term	Proposed Construction
“luminaire”	lighting device
“lighting module”	set of lighting units
“lighting unit”	at least one LED chip and optical system cooperating therewith.

Patent Owner, in its Response, offers no claim constructions for the above terms. Nevertheless, a dispute regarding the scope of a term arose during trial.

“on which the LED is provided”

As we indicated in our Decision on Institution, the Board identified a potential claim construction issue regarding claim 3, which recites “a primary reflector on which the LED chip is provided.” Dec. 8–9 (“The parties will have an opportunity in the Response and Reply to address claim construction regarding this limitation.”). The dispute centers on the scope of the word “on.” Patent Owner argues that the term “on” in claim 3 must be construed as “above and supported by or in contact with.” See PO Resp. 19–20, 50. Petitioner on the other hand, argues that Patent Owner’s proposed construction is too narrow and that the ’774 patent specification and prosecution history do not offend the notion of “on” encompassing “adjacent.” Reply 7–8.

We begin with the claim language and the specification, for these are the best and most reliable guidance as to the meaning of a word. The word “on” is a preposition subject to multiple plain and ordinary meanings. In claim 3, “on” denotes the positional relationship between the primary reflector and the LED chip, which is introduced in independent claim 1, from which claim 3 depends. To start, claim 1 offers little guidance as to the placement of the LED chip, other than to state that a lighting unit comprises at least one LED chip and an optical system. See Ex. 1001, 9:34–35. Claim 3, further recites two optical systems. First, a primary optical system comprises a primary reflector, on which the LED chip is provided, and a transparent envelope, in which the LED chip is embedded. The secondary optical system has a secondary reflector “in whose comparatively narrow

end portion the LED chip is positioned.”⁵ From this language, the word “on” is surrounded by claim terms that give it context. For example, the phrase “on which the LED chip is provided” (claim 3) contrasts another phrase in the same claim “in which the LED is embedded.” That is, claim 3 recites the cooperation between the LED chip and the other devices in the luminaire, which together (primary reflector and transparent envelope) comprise the recited “primary optical system.” From the claim language we find that the recited LED chip is not part of the recited “primary optical system” because independent claim 1 recites the LED chip and optical system as cooperating, but distinct, and the “primary optical system” is one of two systems of the “optical system” of claim 1. Dependent claim 6, (corresponding to the embodiment shown in Figure 5) requires “a primary reflector [] located on a side of the LED chip remote from the wide end of the transparent body.” The language of claim 6 changed after a certificate of correction issued. Before the certificate of correction, the claim recited the “side of the LED chip remote from the wide end of the transparent body is provided on a primary reflector.” Ex. 1001, 10:2–3. The use of the word “on” in claim 6 also denotes the position of the LED chip with respect to the primary reflector, albeit in similar plain language as that of claim 3.

Turning to the specification, and according to Figures 3 and 5 of the ’774 patent, LED chip 30, 130 is shown in the well of primary reflector 41, 141. Figure 3, annotated and reproduced below, for example, illustrates a

⁵ The ’774 patent includes a certificate of correction that effectively removes from the issued claims the numerals identifying the recited elements in the Figures of the specification.

lighting unit 20 with a primary reflector 41 (indicated in yellow) and LED chip 30 (indicated in green).

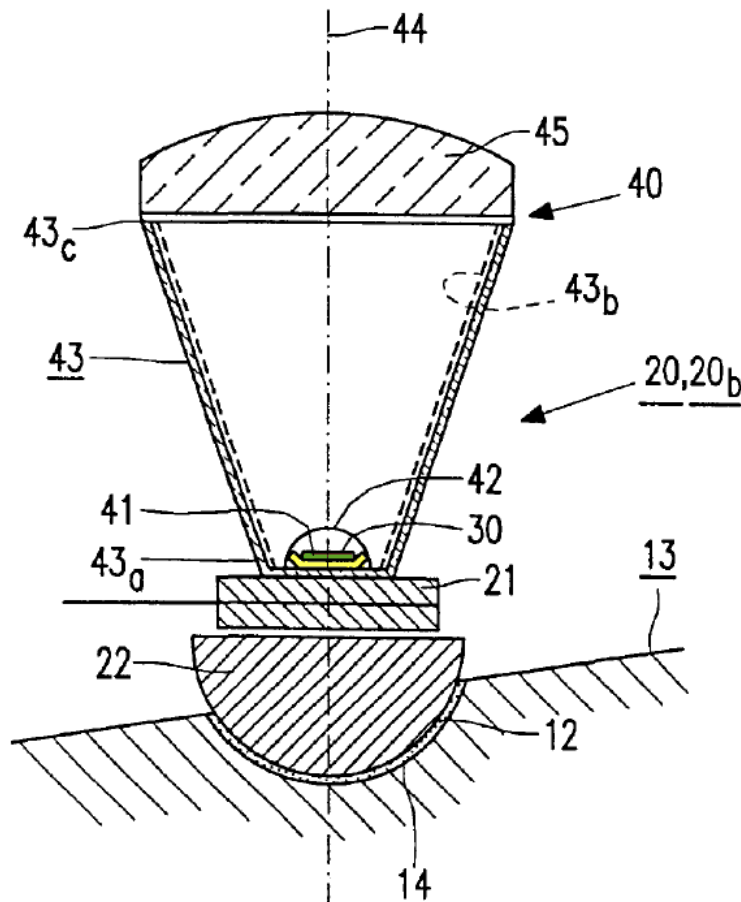


FIG. 3

As stated in the specification, “LED chip 30 is provided on a primary reflector 41 of metal which is fastened on a synthetic resin support 21. The LED chip 30 is accommodated in a synthetic resin envelope 42 which together with the primary reflector 41 forms a primary optical system.” Ex. 1001, 5:58–63. Additionally, the ’774 patent describes a “primary optical system,” in the Summary of the Invention, by stating that “[i]ntegrated units of an LED chip and a primary optical system are generally known under the

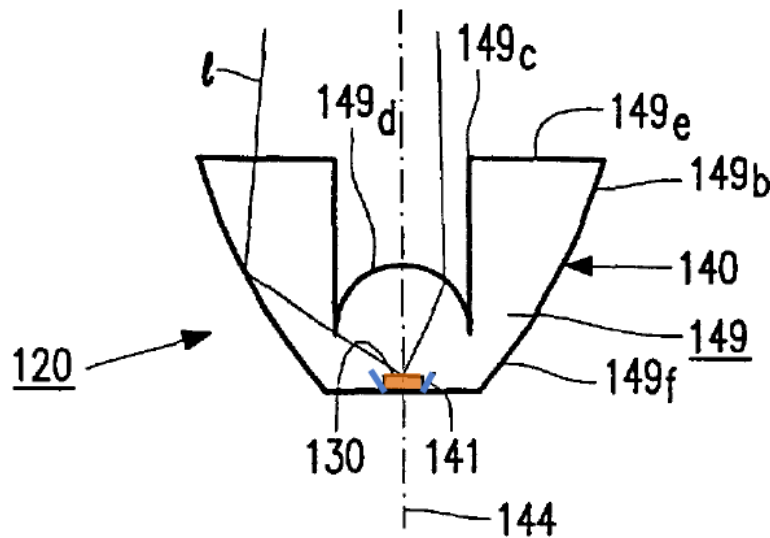
name of LEDs (Light Emitting Diodes), also referred to as LED lamps.” Ex. 1001, 1:44–47. We find this description instructive because it confirms the interpretation of claim 3 that the LED chip is distinct from the primary optical system that includes the primary reflector and the transparent envelope. We also note that the above passage ties the claim language to structures of known LED lamps, which according to one declarant, may include a reflector dish on which the LED chip is attached with epoxy (see Ex. 1015 ¶ 22).⁶ Accordingly, from the specification and the claim language of claim 3, it is reasonable to conclude that the LED chip is stacked on a surface, in the well of the primary reflector.

There also appears to be a dispute as to whether the claims require that the primary reflector, with some portion being underneath the LED chip, reflect light that the LED chip emits in the direction of the primary reflector. We find that the illustration of Figure 3, showing the sides of the primary reflector angled outward, fairly describes that the sides of primary reflector perform the reflecting function. There is no indication, however, in the claims or specification that the surface on which the LED chip is positioned also performs reflective function. There is conflicting testimony from the

⁶ Although the declarant, Dr. Bretschneider, discusses an LED lamp with respect to Turnbull’s disclosure, we find instructive the explanation and illustration of the internal components of a typical LED lamp, which confirms the ’774 patent’s description of “integrated” LED lamps. The testimony appears to be consistent with the prior art cited during prosecution of the ’774 patent, U.S. Patent No. 5,893,633, which describes producing an LED lamp by affixing the LED chip in a “cup” with a silver paste and creating the enclosure by molding the LED with transparent synthetic resin. U.S. Patent No. 5,893, 633, Figs 13A–13B, 14A-14G, 4:35–39; 5:1–13.

parties' respective declarants concerning whether the surface of the primary reflector beneath the LED chip would be a reflective surface. *See, e.g.*, Ex. 2008 ¶ 44 (opining that there is a need to have a primary reflector beneath the LED chip because the light emitted down would otherwise be lost); *but see* Ex. 1015 ¶ 21 (stating that LED chips are mounted with silver filled epoxy, not transparent epoxy, resulting in a highly reflective but opaque material where no light from the LED chip is able to reach beneath, rendering irrelevant whether the surface underneath the LED chip is reflective). On this point, we conclude that the lack of disclosure and the conflicting testimony indicate that neither the intrinsic record nor the understanding of a person of skill in the art requires that the surface on which the LED chip is positioned, in the primary reflector, actually reflect light emitted by the LED chip.

With regard to Figure 5, we find that the illustration and the description provide no further guidance. Figure 5, reproduced below with annotations, depicts LED chip 130 (indicated in orange) and primary reflector 141 (indicated in blue).



The specification of the '774 patent describes LED chip 130 of Figure 5 as “provided with its side remote from the wide end 149c on a primary reflector 141.” Ex. 1001, 7:3–4. It is difficult to tell from Figure 5 whether the primary reflector 141 includes a flat-bottom surface (similar to that shown in Figure 3) on which LED chip 130 is placed. Also, the description of Figure 5 lacks detail on the shape or function of the primary reflector. Therefore, even assuming that the primary reflector of Figure 5 has the same shape as that of Figure 3, we are not able to discern from the Figure 5 embodiment any more detail than that provided with respect to Figure 3. If anything, Figure 5 supports the contention that the salient feature of the primary reflector is the sides adjacent the LED chip.

From these descriptions and the claim language, we conclude that the specification describes the LED chip being “on” the primary reflector to mean put “above.” In the two embodiments just discussed, the LED chip is stacked on the primary reflector so that the angled sides reflect the emitted

light. There is no embodiment showing or describing the LED chip positioned in any other way with respect to the primary reflector.

We need not decide whether “on” also extends to meaning “supported by” or “in contact with,” according to the dictionary definition proffered by Patent Owner. *See* PO Resp. 19 (citing Ex. 2012 at 953). There is no indication in the specification that the primary reflector holds the LED chip to lend support. *See, e.g.*, Ex. 1001, Figure 11 (depicting a luminaire with lighting units 420 mounted on lighting posts illuminating downward, i.e., a road surface); 4:10–13; 8:4–19. Indeed, the specification describes the LED chip as being accommodated in a synthetic resin envelope 42. *Id.* at 5:60–63. That is, although the primary reflector and the LED chip are stacked, there is no indication that the LED chip is supported by the primary reflector or merely held in place by the synthetic resin envelope. There is also no description of direct contact between the LED chip and the surface of the primary reflector. Although there may be indirect contact, if the LED chip is glued on or otherwise affixed (with an intervening layer) to a surface of a primary reflector (*see* Ex. 1015 ¶ 17), the ’774 patent specification leaves unexplained the manner of placement of the LED chip on the primary reflector and the claims do not recite any limitations that concern the structural engagement between the primary reflector and the LED chip. Accordingly, guided by the broadest reasonable interpretation of the claim language in light of the specification, we determine that the phrase “primary reflector on which the LED chip is provided” means that the LED chip is “above” or stacked on the primary reflector.

B. PRINCIPLES OF LAW

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

C. THE LEVEL OF SKILL IN THE ART

In determining the level of ordinary skill in the art at the time of the invention, we note that various factors may be considered, including “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)).

Petitioner asserts, through its declarant, Dr. Eric Bretschneider, that a person of ordinary skill in the art would have had at least,

a B.S., or equivalent experience, in electrical engineering, chemical engineering, materials science, or a related field, including at least three years of experience designing, constructing, and/or testing LED fixtures and lamps.

Ex. 1006 ¶ 14. Dr. Bretschneider also opines that he would have been a person of ordinary skill in the art at least by 1996. *Id.*

Patent Owner, through its declarant, Dr. Malvin Teich, proffers that a person of ordinary skill in the art would have “at least a Bachelor’s degree in Electrical Engineering or a related field, and at least three years of experience and knowledge in optics or a related field.” Ex. 2008 ¶ 37. Dr. Teich also opines that “[a] Master’s degree in Electrical Engineering, Physics, or a related field can substitute for a year of work experience.” *Id.* Neither declarant explains what factors were considered to render their respective opinions. Nor do the declarants address how the particular educational level each proposes is germane to the level of ordinary skill. Dr. Teich states that his opinion is based on his “years of working with and teaching students and other professionals,” but he does not explain how this experience addresses any of the factors we consider in determining the level of ordinary skill in the art. *Id.* See *In re GPAC, Inc.*, 57 F.3d at 1579.

Nevertheless, both declarants appear to agree that a person of ordinary skill in the art would have attained, at a minimum, a Bachelor’s degree in electrical engineering and three years of experience. The proffered opinions differ significantly on the fields in which the experience is attained. Dr. Bretschneider focuses on the field of “designing, constructing, and/or testing LED fixtures and lamps,” while Dr. Teich focuses on the field of “optics or a related field.” Ex. 1006 ¶ 14; Ex. 2008 ¶ 37. On this point, we find that Dr. Bretschneider’s opinion is more reasonable for the reasons that follow.

First, the '774 patent addresses a disadvantage of prior art luminaires of difficulty in concentrating light into a beam. Ex. 1001, 1:1–27. That disadvantage is overcome by providing a luminaire that more efficiently utilizes the light generated by the light source. *Id.* at 1:30–32. That light source is formed by optical systems and LED chips that supply a luminous flux of at least 5 lumen during operation. *Id.* at 1:33–40. From these disclosures we can infer that a person of ordinary skill in the art was working with LED technology and designing lighting units that would more efficiently guide the emanated light. That design involves aspects of LED chip operation (*see id.* at 1:43–62), as well as light manipulation through the use of optical systems, such as reflecting, refracting, diffracting, and other light distribution techniques (*see id.* at 1:62–2:29, 41:55). Therefore, the technology-at-issue and encountered problems inform us that the field of the art is lighting-unit design and construction, with particular emphasis on the use of LED lamps.

Second, the prior art of record also reflects the level of a person of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). For example, the Turnbull reference is directed to an illuminator assembly incorporating LEDs. Ex. 1003:5–9. Although Turnbull is focused on a particular problem of using LED lamps of various hues to produce white light with sufficient luminous intensity, the reference explains the general state of the art, at the time of the invention, with respect to conventional LED lamps, chips, and other LED designs, and their incorporation in illuminators with various optical elements

to influence the light generated by the LEDs. *See* Ex. 1003, 10:42–11:43; 13:30–59. Kish, the second reference of record, is directed specifically to LED design and testing. Ex. 1004. Therefore, we find that these references confirm that the pertinent field of the art is lighting-unit design and construction, with particular emphasis on the use of LED lamps. Accordingly, we are persuaded that Dr. Bretschneider’s opinion—a person of ordinary skill in the art would have at least three years of experience designing, constructing, and/or testing LED fixtures and lamps—is reasonable in light of the above discussion.

We do not credit Dr. Teich’s opinion that the experience is tied solely to “optics or a related field.” To begin with, the field of “optics” is a very broad field. The ’774 patent and the pertinent prior art do incorporate optical systems. But alleging that the field is “optics,” without restriction, finds no support in this record. Furthermore, LED operation and design is part of the field in question, according to the record before us. And Dr. Teich’s opinion fails to account for this, to the extent it is not particularly pointed out. Although one may take the view that LEDs may be part of the “optics” field in general, we are not persuaded that a person of ordinary skill in the art would have experience in “optics,” but no particular experience with LEDs or light-unit design. Again, the prior art of record and the ’774 patent inform us that the art in question is more narrow than “optics.”

Accordingly, we credit Dr. Bretschneider’s opinion and rely on our own analysis, as stated above, to find that the level of ordinary skill is defined by the knowledge and experience attained through a B.S., or equivalent experience, in electrical engineering, chemical engineering,

materials science, or a related field, including at least three years of experience designing, constructing, and/or testing LED fixtures and lamps.

D. THE ASSERTED PRIOR ART

This case presents a single ground of unpatentability: obviousness over Turnbull and Kish. A discussion of Turnbull and Kish follows.

1. Overview of Turnbull (*Ex. 1003*)

Turnbull describes an illuminator assembly incorporating light emitting diodes, and more particularly, white light illumination systems utilizing light emitting diodes having complementary hues. *Ex. 1003*, 1:5–9. Turnbull explains that white illuminators of the past rely almost exclusively on incandescent lamps as light sources because incandescent light bulbs are inexpensive to produce in a variety of forms, and they produce copious quantities of white light. *Id.* at 3:41–45. Incandescent lamps had various shortcomings, however. *Id.* at 3:46–48. Turnbull provides an LED illuminator capable of producing white light with sufficient luminous intensity to illuminate subjects of interest well enough to be seen and to have sufficient apparent color and contrast so as to be readily identifiable. *Id.* at 7:19–24.

Figure 1, reproduced below, shows one embodiment incorporating conventional discrete LEDs, and Figure 2 shows an embodiment incorporating individual LED chips. *Id.* at 10:42–46.

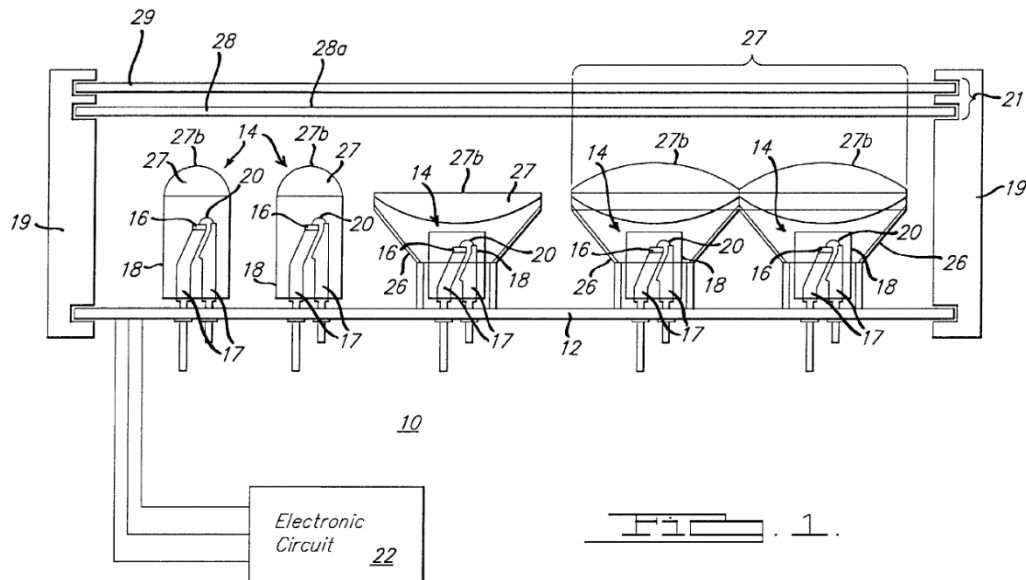


Figure 1 depicts illuminator 10, including support member 12, which maintains a spatial relationship between a plurality of conventional discrete LEDs 14. *Id.* at 10:59–67. Conventional discrete LED 14 generally includes a semiconductor LED chip or “die” 16. *Id.* at 11:6–11. In most conventional discrete LED designs, enclosure 18 also acts as an integral optical element such as lens 27, deviator 28, or diffuser 29. *Id.* at 11: 49–53. Separate or secondary elements 21, however, may be incorporated in illuminator 10 to improve performance or appearance. *Id.* Reflector 26 collects or assists in the collection of light emitted by LED chip 16 and projects it toward the area to be illuminated in a narrower and more intense beam. *Id.* at 12:67–13:3.

2. Overview of Kish (Ex. 1004)

Kish describes high luminous flux operation of large-area LEDs fabricated by semiconductor wafer bonding. Ex. 1004, p. 1790. This device

is capable of emitting a peak DC luminous flux of 84 lumens, which is two orders of magnitude greater than a conventional LED. *Id.*

E. MOTIVATION TO COMBINE: INDEPENDENT CLAIMS 1 AND 14

Petitioner contends that Turnbull discloses all the limitations of claims 1 and 14, except for the “5-lumen limitation”: LED chip [each] supplying a luminous flux of at least 5 lm during operation. Pet. 14–26; 32–39. For that limitation, Petitioner relies on Kish’s disclosure of an LED (having an LED chip) capable of emitting a peak DC luminous flux of 84 lumens. Pet. 20–26. Petitioner contends that a person of ordinary skill in the art “would be motivated to combine the amber LEDs disclosed in Kish with the LED lamp architecture disclosed in Turnbull to create an LED lamp with a luminous flux in excess of 5 lumens during operation.” *Id.* at 26 (citing Ex. 1006 ¶ 71).

More particularly, Petitioner describes the alleged motivation by pointing out that Turnbull prefers LEDs that have very high luminous efficacy in terms of light emitted compared to electrical power consumed. Pet. 20. Because the Kish LEDs do not require significant electrical power to produce their high luminous flux, Petitioner argues that a person of ordinary skill would have been motivated to combine the Kish LEDs with the Turnbull LED-lamp architecture. *Id.* at 21.

At oral argument counsel for Petitioner implied that a motivation to “put in a bigger bulb, to get more light out” may not be needed. Tr. 8:16–18. But, even if it were needed, Petitioner proffers that Turnbull teaches overall that LEDs are a better choice than incandescent light. *Id.*

8:21–25; 9:17–21; 11:8–17. First, Petitioner has the burden of showing unpatentability. 35 U.S.C. § 316(e). This burden includes articulating, in the Petition, sufficient reasoning, even if it relies on an application of common sense. 37 C.F.R. § 42.104 (a)(4); *In re Zurko*, 258 F.3d 1379, 1385 (Fed. Cir. 2001) (“[D]eficiencies of the cited references cannot be remedied by . . . general conclusions about what is ‘basic knowledge’ or ‘common sense’ to one of ordinary skill in the art.”). Here, Petitioner failed to articulate, in either the Petition or the Reply, the broad rationale argued for the first time at oral argument—that Turnbull teaches that LEDs are a better choice than incandescent light bulbs. Rather, the Petition repeatedly points out, as a motivation, Turnbull’s disclosure of the desirability of using LEDs with high luminous intensity and efficacy. *See* Pet. 10, 13, 20, 24 (“Turnbull specifically suggests that transparent substrate AlInGaP amber LEDs would have the very high luminous efficacy desired for inclusion in the Turnbull LED lamp structure”). The argument presented at oral argument that Turnbull offers a broader motivation is not timely. Therefore, that argument will not be considered. *See Dell Inc., v. Acceleron, LLC*, 818 F.3d 1293, 1301 (Fed. Cir. 2016) (concluding that procedural rights of Patent Owner are denied by relying on “a factual assertion introduced into the proceeding only at oral argument, after [Patent Owner] could meaningfully respond.”).

In connection with the motivation to use Kish LEDs, the Petition also points to the adequacy of the size and color of the Kish LED. Specifically, with regard to size, Petitioner argues that “a person having ordinary skill in the art would also appreciate that the size of the Kish LED is appropriate for inclusion in the LED lamp architecture disclosed in Turnbull.” Pet. 24.

With regard to color, Petitioner argued that, although Turnbull teaches using amber LEDs in combination with blue-green LEDs to achieve white light by color mixing, “the use of the amber Kish LEDs *alone* in the Turnbull LED lamp architecture would yield desirable results.” *Id.* at 25 (emphasis added). These arguments are supported by Dr. Bretschneider’s declaration (Ex. 1006), at paragraphs 70 and 71.

Patent Owner challenges the alleged motivation with two arguments. The first argument is that the alleged combination would render Turnbull inoperable for its intended purpose. PO Resp. 32–36. The second argument is that Turnbull teaches away because the Kish LED presents some of the disadvantages that Turnbull identifies with the use of incandescent lamps. *Id.* at 36–45. In particular, Patent Owner identifies three characteristics that incandescent lamps and the Kish LED have in common: inefficiency, heat generation, and size. *Id.* Because we find, as discussed below, that the alleged combination would render Turnbull inoperable for its intended purpose, we do not address the rest of Patent Owner arguments outlined above.

1. Consideration of Arguments Regarding Inoperability of Turnbull

Turnbull is particularly concerned with mixing light from complementary LED hues to obtain metamerically white light. Ex. 1003 at Abstract, 1:5–9, 7:27–55, 9:63–67, 10:13–18, 14:61–66. Indeed, Turnbull describes “the present invention” as providing a “white-light LED illuminator” or “an LED illuminator . . . capable of producing white light.” *Id.* at 9:63–65. Furthermore, Turnbull describes that white light illuminators

in vehicles and portable applications had relied almost exclusively on incandescent lamps, 3:42–46, because white light “is essential for most illuminator systems.” *Id.* at 5:66–6:3. A solution Turnbull offers is an illuminator that mixes light emitted from amber and blue-green LEDs by projecting overlapped beams that form metameric white light illumination having sufficient intensity and color rendering qualities. *Id.* at 7:61–8:7.

Patent Owner argues that to achieve white light using amber LEDs, Turnbull discloses mixing the light from three amber LEDs (of wavelengths between 572 and 600 nm) with the light from two blue-green LEDs (of wavelengths between 476 and 492 nm). PO Resp. 34. Utilizing only the Kish LEDs, as Petitioner contends in the Petition, would not result in white light. Instead, Patent Owner argues, the Kish LEDs (ranging between 600 to 615 nm in wavelength) would produce amber light. *Id.* (citing Ex. 2008 ¶¶ 82–83). Thus, according to Patent Owner, because the result of Petitioner’s proposed combination (red-amber light) would be contrary to the purpose of Turnbull (white light), a person of ordinary skill in the art would not be motivated to pursue the combination. *Id.* at 35.

Petitioner attempts to respond to Patent Owner’s inoperability argument in its Reply with a new argument. Reply 5–6. The new argument is that the Kish LED could be used to produce white light. *Id.* Petitioner supports its argument with additional testimony from Dr. Bretschneider that a person of ordinary skill in the art would have been able to use the Kish LED to produce metameric white light by mixing light from cyan/green LEDs according to Turnbull’s chromaticity diagrams. Reply 5–6 (citing Ex. 1015 ¶ 13–15).

We note that Petitioner's reply does not respond to Patent Owner's contention that Turnbull would be rendered inoperable with the use of *only* amber LEDs, as Petitioner contended initially. Instead, Petitioner challenged an assertion that Dr. Teich did not make. See Reply 5 ("Contrary to Dr. Teich's assertion, a POSA would have been able to use a Kish LED to produce metamerically white light by using the teachings in Turnbull"). As stated above, Patent Owner challenged Petitioner's initial position that using the Kish LEDs *alone* would not produce the white light Turnbull desires. We do not find any assertion by Patent Owner that a person of ordinary skill in the art would not be able to use a Kish LED with Turnbull to produce white light. If that were a position Patent Owner took, then Petitioner's argument in the Reply would have been responsive to Patent Owner's assertions. But that is not the case here.

We must first decide whether Petitioner exceeded the appropriate scope of the Reply by including new or non-responsive arguments. See Papers 50, 56. The above-described argument, concerning producing white light with Kish LEDs, is one of those arguments.⁷ To determine whether we should consider the argument, our Trial Practice Guide points out that,

[w]hile replies can help crystalize issues for decision, a reply that raises a new issue or belatedly presents evidence will not be considered and may be returned.

⁷ Although not discussed in detail hereinafter, Petitioner's argument in the Reply concerning resizing the LED chip in Kish and making other design changes are also new arguments. See Reply 3–4. The Petition states that the size of the LED disclosed in Kish was appropriate for inclusion in Turnbull. Pet. 24. No such modifications of the Kish LED were alleged in the Petition.

The Board will not attempt to sort proper from improper portions of the reply. Examples of indications that a new issue has been raised in a reply include new evidence necessary to make out a prima facie case for the patentability or unpatentability of an original or proposed substitute claim, and new evidence that could have been presented in a prior filing.

Trial Practice Guide, 77 Fed. Reg. at 48767. With these guidelines in mind, we are persuaded that the argument should not be considered in deciding this matter.

In particular, we find that the argument presented in the Reply could have been presented in the Petition. Petitioner's position is quite clear in the Petition, which states that, notwithstanding the mixing light aspects of *Turnbull*, a person of ordinary skill in the art would have been motivated to obtain yellow light using *only* the Kish LEDs. Pet. 25–26. That is, Petitioner was aware of *Turnbull*'s purpose of producing white light by color mixing. Nevertheless, Petitioner chose its contention of relying on the knowledge of a person of ordinary skill in the art to produce *only* yellow light with *Turnbull*. If a person of ordinary skill in the art also would have been motivated to produce white light with the Kish LEDs, Petitioner could have asserted this contention at the outset, especially since Petitioner relies on *Turnbull*'s teachings for this late contention.

Additionally, to be proper, the scope of the Reply must respond to arguments in Patent Owner's Response. Here, the arguments and evidence—that a person of ordinary skill in the art would obtain white light using the Kish LEDs—are not responsive to Patent Owner's argument that *Turnbull* would be rendered inoperable for its intended purpose. The

argument presented is a new substitution: Using Kish LEDs with other cyan/green LEDs, instead of Turnbull's LEDs, to produce white light. This is quite different from the initially presented contention that all the LEDs used in the Turnbull structure would be Kish LEDs. Further, the Reply does not respond to whether Turnbull's intended purpose is, indeed, to produce white light or whether Patent Owner's evidence in this regard is erroneous in any way. The Reply diverts from the rationale provided in the Petition and offers a new substitution. Without good reason to do so, we do not consider a *different* motivation or *another* substitution argued and briefed for the first time in the Reply. *See* 37 C.F.R. § 42.23 (b) ("A reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, or patent owner response.").

2. Petitioner's Alleged Combination Would Render Turnbull Inoperable for its Intended Purpose

We are persuaded by Patent Owner's arguments and evidence that Turnbull would be rendered inoperable for its intended purpose. Petitioner's challenge of unpatentability focuses on substituting in Turnbull's lighting unit the LEDs disclosed in Kish. Pet. 25–26. We agree with Patent Owner's argument and evidence that the Kish LEDs in Turnbull's device would not yield white light. PO Resp. 32–36. We also agree with Patent Owner's argument that Turnbull's intended purpose is to produce white light by mixing LEDs of complementary colors. *Id.* Accordingly, the substitution proffered by Petitioner would not work to produce white light, and is contrary to the intended purpose of Turnbull. *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984).

It is irrelevant at this point whether a person of ordinary skill in the art *could* produce white light using Kish LEDs in Turnbull. As determined above, the argument and evidence that Kish LEDs could be used to produce white light will not be considered. Further, the reasoning articulated in the Petition has not been shown to be reasonable in light of the record. For example, Petitioner asserts that a person of ordinary skill in the art would find yellow light to be desirable for outdoor illumination tasks. Pet. 25 (citing Ex. 1003 at 2:36–47). This reasoning, however, is not supported by Turnbull as alleged by Petitioner. In the passage relied on, Turnbull recognizes that yellow light has been used for outdoor lighting, but notes that detection and identification of objects and printed images is “very difficult if not impossible.” Ex. 1003, 2:36–42. Thus, we do not find Turnbull as supporting the contention that yellow light illumination was either useful or desirable. Indeed, Turnbull describes the uses for its illuminator in vehicular applications (not outside lighting), and states that other, non-vehicular uses are contemplated if requiring “high efficiency, high reliability, long life, low-voltage compact, effective *white light* illumination.” *Id.* at 33:32–37 (emphasis added). Therefore, we find, that even if Turnbull were adaptable for outside illumination, the teaching of producing only white light would continue to be applicable.

We are also not persuaded that a general motivation may be found in the common use of Low Pressure Sodium (LPS) lamps, which emit a highly saturated yellow light, for street lighting. See Pet. 25 (citing Ex. 1006 ¶ 71). We fail to see how the common use of an LPS lamp for street lighting motivates a person of ordinary skill in the art to disregard the intended

purpose of Turnbull to produce white light. As stated above, Turnbull expressly dictates to use the disclosed illuminator to produce white light, even in non-vehicular uses. Thus, even if we recognized that it was commonly acceptable to use yellow light for street or outside lighting, no motivation has been shown for using Turnbull's illuminators as such, especially when the reference has a contradictory purpose.

Finally, we do not find persuasive the argument that we can ignore the yellow versus white-light issue because the claims-at-issue do not require emitted light of any particular color. *Id.* Although we agree with the premise that the claims are silent in this regard, we find the argument not germane to the contention of unpatentability set before us. The issue is whether a person of ordinary skill in the art would have been motivated to use Kish LEDs *alone* in the Turnbull illuminator. That question does not turn on whether the claims-at-issue require light of any particular color. Rather, the question turns on whether the articulated rationales are reasonable in light of the state of the art at the time of the invention and the references being considered. Starting the analysis with the claim would be an exercise in hindsight: using the claims as a roadmap to navigate the prior art. "It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (citing *In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991)).

Accordingly, we find that the substitution alleged by Petitioner—Kish LEDs *alone* with Turnbull's illuminator—would render Turnbull inoperable

for its intended purpose of producing white light. We also find that, even if there were a motivation to consider the alleged high efficiency of the Kish LED (on which we do not render an opinion), such a motivation does not overcome the inoperability of Turnbull, which would dissuade a person of ordinary skill in the art from using Kish LEDs *alone*.

3. Conclusion Regarding Claims 1 and 14

We determine that the alleged motivations to combine, as discussed above, are insufficient. Therefore, Petitioner has failed to show by a preponderance of the evidence that claims 1 and 14 would have been obvious over Turnbull and Kish.

F. DEPENDENT CLAIMS 3 AND 5

Claims 3 and 5 depend from claim 1, discussed above. We have determined that Petitioner did not meet its burden with regards to claim 1. Therefore, the burden also is not met for these dependent claims.

Nevertheless, with regard to claim 3, the parties dispute whether the LED chip is provided “on” the primary reflector as identified by Petitioner in Turnbull. Determination of this issue turns on the claim construction of the phrase. *See supra*, section II.A.

Petitioner relies on Turnbull disclosing that a “miniature reflector cup” (primary reflector) may be located adjacent to the LED chip. Pet. 27 (citing Ex. 1003, 11:18-20). Patent Owner argues that the meaning of “on” is not consistent with the disclosure of the Turnbull reflector being “adjacent” to the LED chip. PO Resp. 50–51. We find that Turnbull teaches or suggests that the LED chip is on the miniature reflector cup. On

this point we find informative Dr. Bretschneider's opinion that the "adjacent" placement of Turnbull's reflector cup is not to the side of the LED chip. Reply 9; Ex. 1015 ¶ 22; Ex. 2027, 117:9–118:17. Furthermore, it makes sense for the reflector cup to be proximate to the LED chip, such that the LED chip is within the cup. The point of the reflector cup is to reflect the light emitted by the LED. And the sides (adjacent to the LED chip) of the reflector cup perform this function. As the name implies and Turnbull explains, the reflector cup is there to improve the light extraction. See Ex. 1003, 11:18–20. On this point we also agree with Dr. Bretschneider's explanation that the configuration of the LED chip being enclosed within the cup (and thus "on" the reflector) is a type of configuration that efficiently collects side emissions from the LED chip and direct that light forward (away from the LED chip). Ex. 1015 ¶18. Accordingly, we are persuaded that Turnbull discloses that the LED chip is provided on the primary reflector as required in claim 3.

With regard to claim 5, we are not persuaded that Petitioner has met its burden of showing that the art teaches the recited limitations. Claim 5 requires a transparent body with a first optical part and a second optical part. Petitioner points to various optical elements in Turnbull that perform reflective and refractive functions. Pet. 30–31. Petitioner's assertions provided various alternatives. For example, for the first optical part, Petitioner points to secondary optical elements 21 that comprise lens 27, deviator 28 (refractive mode), and diffuser 29. Pet. 30. Petitioner also points to variants of lenslet 27a implemented with catadioptric optical elements that utilize both reflection and refraction. *Id.* For the second

optical part, Petitioner points to reflector 26, and the same lenslet 27a implemented with catadioptric optical elements. Pet. 31.

Patent Owner argues a deficiency in Petitioner's challenge because of a failure to show that the alleged first optical part and second optical part form a "transparent body" as claimed. PO Resp. 53–54. We are persuaded by this argument. Petitioner pointed to many optical elements separately and independently, without pointing out how these elements form a transparent body. In its Reply, Petitioner does not clarify the matter. Instead, it argues the benefits of catadioptric optical systems to reflect and refract. Reply 9–10. But this argument fails to respond to Patent Owner's evidence, presented in the Patent Owner Response, that Petitioner failed to show which elements in Turnbull that are refractive (first optical part) and reflective (second optical part) are alleged to form a transparent body. At best we can infer from the Reply's argument that the catadioptric optical elements, such as lenslet 27a, may be alleged to be both the first optical part and the second optical part. This assumption on our part does not resolve the dispute, however. Petitioner has the burden to show by a preponderance of the evidence that Turnbull teaches or suggests the transparent body with the first (refractive) and second (reflective) optical parts. Arguing that a wide variety of optical elements may be combined to form these parts is insufficient in light of Patent Owner's arguments that the alleged parts identified in the Petition would not form a transparent body. See PO Resp. 53 ("Even if reflector 26 and lens 27 could be physically joined, reflector 27 is metal or metal-coated molded plastic [], not a "transparent" body as described in the '774 patent."). Accordingly, we are not persuaded that

Petitioner has met its burden of showing that Turnbull teaches or suggests the limitations of claim 5.

Notwithstanding the above findings regarding claims 3 and 5, because of the deficiencies noted above with respect to claim 1, we determine that Petitioner has not met its burden of proving by a preponderance of the evidence that dependent claims 3 and 5 are unpatentable as obvious over Turnbull and Kish.⁸

G. MOTION TO EXCLUDE

Petitioner seeks to exclude as hearsay statements in declarations proffered by Patent Owner in support of its arguments of secondary indicia of nonobviousness. Paper 48 (“Motion to Exclude”). Furthermore, Petitioner seeks to exclude testimony of its own witness regarding Exhibits 2025 and 2026. *Id.* Petitioner also seeks to exclude various exhibits supporting the declarations described above. *Id.*

The Motion to Exclude is denied as moot, because that evidence objected to is not relied upon in reaching our determination that Petitioner has not met its burden of showing that claims 1, 3, 5, and 14 are unpatentable.

⁸ Patent Owner presented evidence of secondary indicia of nonobviousness. Because we did not find that Petitioner has shown obviousness of the challenged claims, we do not decide whether Patent Owner’s evidence would have been given any weight in considering the patentability of the challenged claims.

III. CONCLUSION

For the foregoing reasons, we conclude that Petitioner *has not shown* by a preponderance of the evidence that claims 1, 3, 5, and 14 of the '774 patent are unpatentable as obvious over Turnbull and Kish. Petitioner's Motion to Exclude is denied as moot.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 3, 5, and 14 of the '774 patent have not been shown to be unpatentable;

ORDERED that Petitioner's Motion to Exclude is *denied*; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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