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571-272-7822

Paper 41
Date: February 18, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EVERSTAR MERCHANDISE CO., LTD.,
Petitioner,

v.

WILLIS ELECTRIC CO., LTD.,
Patent Owner.

IPR2019-01485
Patent 9,157,588 B2

Before DEBRA K. STEPHENS, STACEY G. WHITE, and JEFFREY W. ABRAHAM, *Administrative Patent Judges.*

STEPHENS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Granting Motion to Seal
Denying-in-part and Dismissing-in-part Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

Everstar Merchandise Co., Ltd. ("Petitioner") filed a petition for *inter partes* review (Paper 1 ("Pet.")) challenging claims 1–20 (the "challenged claims") of U.S. Patent 9,157,588 B2 (Ex. 1001 ("'588 Patent")) (35 U.S.C. § 311). Willis Electric Co., Ltd. ("Patent Owner") timely filed a Preliminary Response (Paper 6 ("Prelim. Resp.")). We instituted this proceeding in our Decision to Institute (Paper 7 ("Dec.")). Patent Owner filed a Patent Owner Response (Paper 15 ("PO Resp.")), Petitioner filed a Petitioner Reply (Paper 22 (Paper 22 ("Reply")) and Patent Owner followed with a Patent Owner Sur-Reply (Paper 26 ("PO Sur-Reply)).

Patent Owner additionally filed a Motion to Exclude Evidence (Paper 32 ("Mot. to Ex.") to which Petitioner filed an Opposition to Patent Owner's Motion to Exclude (Paper 33 ("Pet. Opp.")). Patent Owner then filed a Reply in Support of its Motion to Exclude (Paper 37 ("PO Reply to Opp.")).

The parties also filed a Joint Motion to Seal Exhibit 1024 (Paper 23).

On December 16, 2020, the parties presented arguments at an oral hearing for this proceeding and for PGR2019-00056. The transcripts of the hearings have been entered into the record (Paper 39 ("IPR Tr."); Paper 40 ("PGR Tr.")).

A. Real Parties-in-Interest

Patent Owner states that the

> real parties of interest are WILLIS ELECTRIC CO., LTD., located at 8F, No. 310, Sec. 4, Zhongxiao E. Road, Da'an Dist., Taipei City 106, Taiwan; WEBER ELECTRIC CO., LTD., located at 8F, No. 310, Sec. 4, Zhongxiao E. Road, Da'an Dist., Taipei City 106, Taiwan; WILLPOINT INTERNATIONAL INC., located at 2nd Floor, Building B, SNPF Plaza, Savalalo, Apia, Samoa; WILLIS ELECTRIC CO., LTD., located at 25 Guzman Street Belama Phase 1 Belize City, Belize, C.A.; YUCENT GROUP LIMITED, located at Unit 1405, 14/F, Lippo Sun Plaza, 28 Canton Road, Tsim Sha Tsui, Hong Kong; KUGIN DEVELOPMENT LIMITED, located at Unit 1405, 14/F, Lippo

> Sun Plaza, 28 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong; KUPOINT (DONG GUAN) ELECTRIC CO., LTD., located at Huaide Industrial Area, Humen Town, Dong Guan, Guang Dong Province, China; and DONGGUAN KUPOINT LIGHTING & WIRE CO., LTD.

(Paper 4, 2).

Petitioner states "Everstar Merchandise Co., Ltd. is the real party-in interest" (Pet. 2).

B. Related Matters

Petitioner states that there are no other judicial or administrative matters that would affect, or be affected by, a decision in this proceeding (Pet. 2; Paper 18).

Patent Owner indicates that U.S. Patents 9,140,438 B2, 9,243,788 B2, 9,671,097 B2, and 10,222,037 B2 are related to the '588 Patent (Prelim. Resp. 10). In particular, those patents and the '588 Patent claim priority to U.S. Provisional Patent Application 61/877,854 (*id.*). Patent Owner also indicates that U.S. Patent 9,671,097 B2 is the subject of IPR2019-01484 and US Patent 10,222,037 B2 is the subject of PGR2019-00056 (*id.*; Paper 4, 3).

Additionally, the '588 Patent incorporates by reference U.S. Patent 8,454,186, which was the subject of IPR2014-01263 and IPR2014-01264 (Prelim. Resp. 22–23 n.2; Ex. 1001, 18:31–37).

C. The '588 Patent (Ex. 1001)

The '588 Patent, titled "Decorative Lighting With Reinforced Wiring," issued October 13, 2015 (Ex. 1001, codes (45), (54)). The '588 Patent describes a strengthened, i.e., breakage-resistant, decorative light string assembly which uses a reinforcing strand to connect multiple lamp elements (*id.* at code (57), 1:43–46, 3:66–4:4). Decorative light strings are used, for example, as "seasonal holiday lighting," e.g., "Christmas lights" (*id*. at 1:21–24, 30–31; *see* Figs. 7A, 19–20, 26–30). Figure 7A of the '588 Patent shows an embodiment of a reinforced decorative light string and is reproduced below.

Fig. 7A

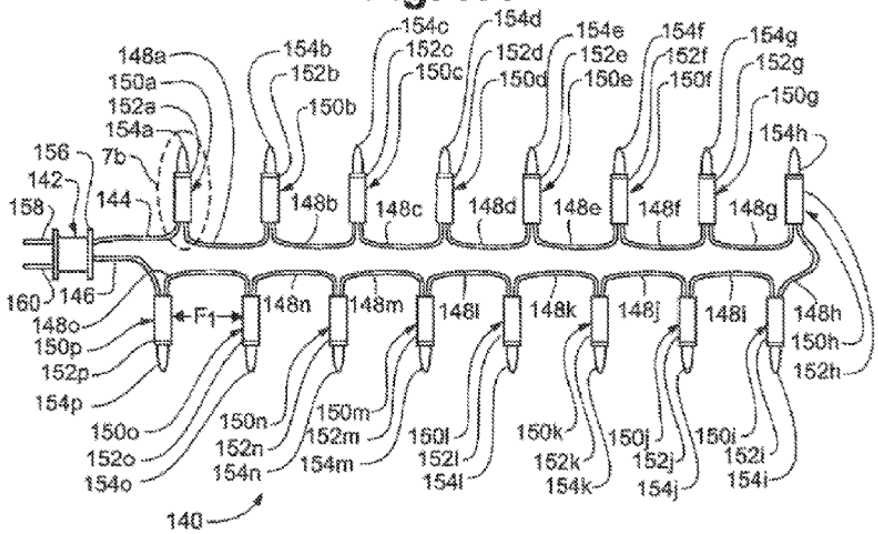


Figure 7A shows a reinforced, series-connected,
decorative light string (Ex. 1001, 2:41–42).

As shown in Figure 7A, "a plurality of lamp assemblies 150a–150p" are connected by "light-connecting wires 148 [which] all comprise reinforced decorative lighting wire 100" (*id.* at 10:63–64, 11:3–4). For example, lamp assembly 150a is connected to adjacent lamp assembly 150b via reinforced decorative light-connecting wire 148.

The reinforced decorative lighting wire 100 connecting the lamp assemblies 150a–150p is shown in detail in Figure 3, reproduced below:

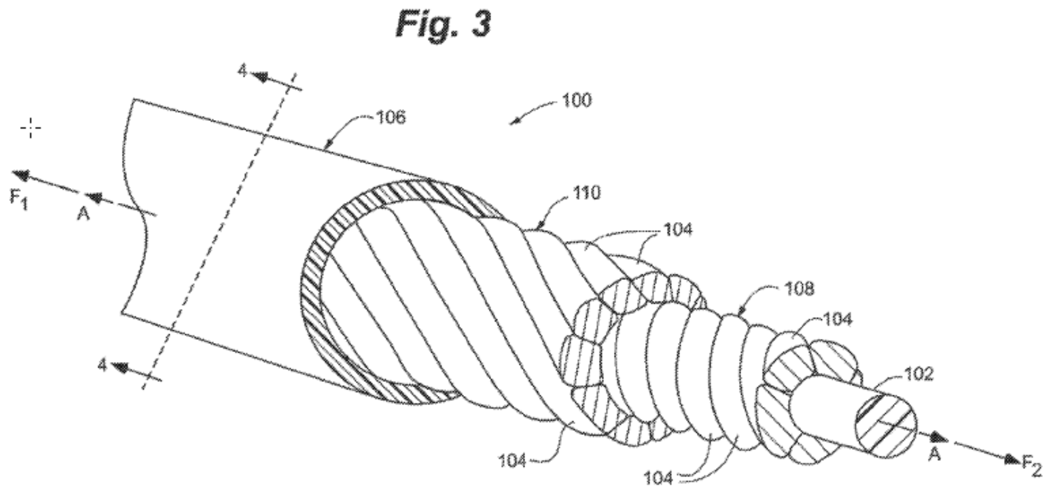


Figure 3 shows a perspective view of a reinforced decorative wire (Ex. 1001, 2:28–29).

As shown in Figure 3, the "reinforced decorative-lighting wire 100 comprises a single reinforcing strand 102, and multiple conductor strands 104 forming first conductor layer 108 and second layer 110" (*id*. at 4:56–59). Further, the "central reinforcing strand 102 comprises one or more fibers or strands of fibrous reinforcing material," for example, "reinforcing strand 102 comprises multiple strands of reinforcing material that may comprise twisted strands, threads or fibers such that reinforcing strand 102 comprises a yarn of multiple strands or fibers" (*id*. at 5:9–16).

D. Illustrative Claims

Of the challenged claims, claims 1 and 7 are independent claims. Claims 2–6 depend, directly and indirectly from claim 1; claims 8–20 depend directly and indirectly from claim 7. Claims 1 and 7 are reproduced below.

1. A reinforced decorative light string for use on an artificial lighted tree having an electrical power source, the decorative light string comprising:

a plurality of lamp assemblies, including a first lamp assembly, a plurality of intermediate lamp assemblies, and a second lamp assembly, each of the plurality of lamp assemblies including a lamp element having a first lead and a second lead;

a first power wire electrically connected at a first end to a first lead of a lamp element of a first lamp assembly and configured to be electrically connected at a second end to the electrical power source of the lighted artificial tree;

a second power wire electrically connected at a first end to a second lead of a lamp element of a second lamp assembly and configured to be electrically connected at a second end to the electrical power source of the tree;

a plurality of reinforced light-connecting wires, each reinforced light-connecting wire electrically connected at a first end to one of the intermediate lamp assemblies and electrically connected at a second end to another of the intermediate lamp assemblies, each of the plurality of light-connecting wires including:

an axially-extending reinforcing strand including a polymer material,

a conductor layer including a plurality of axially-extending conductors adjacent the reinforcing strand, each of the plurality of axially-extending conductors comprising a copper material;

an outer insulating layer enveloping the conductor layer and the reinforcing strand

(Ex. 1001, 28:33–63).

7. A reinforced decorative light string, the decorative light string comprising:

a plurality of lamp assemblies, each of the plurality of lamp assemblies including a lamp element having a first lead and a second lead;

a first power wire electrically connected to at least one of the plurality of lamp assemblies;

a second power wire electrically connected to at least one of the plurality of lamp assemblies;

a plurality of reinforced light-connecting wires, each reinforced light-connecting wire electrically connected to at least two of the plurality of lamp assemblies, each of the plurality of light-connecting wires including:

an axially-extending reinforcing strand including a polymer material,

a conductor layer including a plurality of axially-extending conductors adjacent the reinforcing strand, each of the plurality of axially-extending conductors comprising a copper material;

an outer insulating layer enveloping the conductor layer and the reinforcing strand

(Ex. 1001, 29:18–38).

E. Evidence

Reference	Exhibit No.
Lin, US 2007/0159822 A1, published July 12, 2007	1003
Fujii, US 5,216,205, issued June 1, 1993	1004
Huang, US 2013/0062095 A1, published Mar. 14, 2013	1005
Debladis, US 8,691,120 B2, issued Apr. 8, 2014	1006
Wlos, US 2004/0222012 A1, published Nov. 11, 2004	1007
Harris, US 1,656,148, issued Jan. 10, 1928	1008
Bowden, US 3,831,132, issued Aug. 20, 1974	1009
Pacini, US 3,214,579, issued Oct. 26, 1965	1010

Reference	Exhibit No.
Underwriters Laboratories Inc., UL Standard for Safety for Seasonal and Holiday Decorative Products, UL 588 (2000) ("UL 2002 Standards")[1]	1011

(Pet. 3–5).

Petitioner submits a Declaration of Dr. Stephen D. Fantone (Ex. 1012) and a Supplemental Declaration from Dr. Fantone (Ex. 1018); a Declaration of Mr. Bruce R. Proper (Ex. 1019); and a Declaration and a Supplemental Declaration of Mr. Wai Lung ("Patrick") Wong (Exs. 1020, 1029).

Patent Owner submits a Declaration and a Supplemental Declaration of Dr. Stuart B. Brown (Ex. 2001, 2041) and a declaration of Michael Sugar (Ex. 2045).

F. Asserted Grounds

Petitioner asserts that claims 1–20 would have been unpatentable on the following grounds:

Claim(s) Challenged	**35 U.S.C. §**	**Reference(s)/Basis**
1–3, 6	103	Harris, Fujii (optionally UL 2002 Standards)
4, 5	103	Harris, Fujii, Bowden (optionally UL 2002 Standards)
7–10, 12, 14, 15, 17, 18	103	Lin, Fujii (optionally UL 2002 Standards)
7, 8, 10–14, 19, 20	103	Lin, Huang (optionally UL 2002 Standards)
9	103	Lin, Huang, Debladis (optionally UL 2002 Standards)
11	103	Lin, Huang, Pacini (optionally UL 2002 Standards)

[1] Petitioner appears to refer to page numbers of the document itself, while Patent Owner appears to refer to page numbers of the Exhibit. We refer to page numbers of the document.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
16	103	Lin, Huang, Wlos (optionally UL 2002 Standards)

(Pet. 5–6).

II. ANALYSIS

A. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis (*Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991))).

Petitioner asserts "a person of ordinary skill in the art ('POSITA') would have had at least a Bachelor of Science degree (or equivalent) in Electrical Engineering, or a comparable field, and five or more years of experience in the field of designing electrical wiring and/or decorative lighting" (Pet. 9 (citing Ex. 1012 ¶ 21)).

In its Preliminary Response, Patent Owner disagreed with Petitioner's definition, asserting "the subject matter of the '588 Patent does not require the level of experience for a POSITA that Petitioner proposes" (Prelim. Resp. 24). Instead, Patent Owner submitted

> a POSITA during the relevant timeframe would have been (1) a technician with at least two years of experience in the design of electrical wiring and/or decorative lighting, or (2) a person with at least a bachelor's degree in mechanical engineering, electrical engineering, or an equivalent field, and a basic familiarity with circuits used in decorative lighting

(Prelim. Resp. 24 (citing Ex. 2001 ¶¶ 14–15)).

In the Institution Decision, we adopted Patent Owner's proposed definition, noting that "based on the record and the disclosure in the '588

Patent, we apply Patent Owner's definition of the level of ordinary skill in the art" and determine Patent Owner's definition "comports with the qualifications a person would have needed to understand and implement the teachings of the '588 Patent and the prior art of record" (Dec. to Inst. 10).

In the Response to the Petition, Patent Owner still disagrees with Petitioner's definition and offers a new, modified definition of an ordinarily skilled artisan (PO Resp. 14–15). Specifically, Patent Owner asserts, "the subject matter of the '588 Patent does not require five years of decorative lighting experience to understand, nor would experience only in electrical wiring provide a familiarity with the particularities of decorative lighting" (*id.* at 14). Thus, Patent Owner, relying on statements from its declarants Dr. Brown and Mr. Sugar, argues "a POSITA would have (1) at least two years of experience in the design of decorative lighting, or (2) at least a bachelor's degree in mechanical engineering, electrical engineering, or an equivalent field, and a basic familiarity with circuits used in decorative lighting" (*id.* at 15 (citing Ex. 2041 ¶¶ 14–15; Ex. 2002; Ex. 2045 ¶¶ 1–13)). As such, Patent Owner removes the requirement that an ordinarily skilled artisan be "a technician" and removes reference to "electrical wiring" (*id.*) thus, making "two key changes to its proposed level of skill" according to Petitioner (Pet. Reply 5).

More specifically, Petitioner asserts Patent Owner is "[a]rtificially constraining the level of skill in the art" (Pet. Reply 6). In particular, Petitioner points to the limitation of experience to decorative lighting despite Patent Owner's own expert lacking that knowledge and experience and to the deletion of the requirement to be a technician along with the "two years of experience" (*id.*).

In response, Patent Owner argues their declarant, Mr. Sugar, "has no formal technical or engineering degree, and . . . submits that his *experience* qualifies him as a POSITA and as a technician because he has 33 years in the decorative lighting industry, including lighting design and manufacturing, and is an inventor of patents relating to decorative lighting" (PO Sur-Reply 11 (citing PO Resp. 14–15; Ex. 2045 ¶¶ 4, 13; Ex. 1016, 72:11–16, 114:10–118:13)).

Our determination of the appropriate level of skill in the art does not depend on whether Mr. Sugar qualifies as a person of ordinary skill in the art under a particular definition. To testify as an expert under Federal Rule of Evidence 702, a person need not be a person of ordinary skill in the art, but rather must be "qualified in the pertinent art" (*Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008); *see SEB S.A. v. Montgomery Ward & Co.*, 594 F.3d 1360, 1372–73 (Fed. Cir. 2010) (upholding a district court's ruling to allow an expert to provide testimony at trial because the expert "had sufficient relevant technical expertise" and the expert's "knowledge, skill, experience, training [and] education . . . was likely to assist the trier of fact to understand the evidence" (alteration in original, internal quotation marks omitted)); *Mytee Prods., Inc. v. Harris Research, Inc.*, 439 F. App'x 882, 886–87 (Fed. Cir. 2011) (non-precedential) (upholding admission of the testimony of an expert who "had experience relevant to the field of the invention," despite admission that he was not a person of ordinary skill in the art)). Thus, although a consideration, Mr. Sugar's level of skill is not determinative of what skills a person of ordinary skill in the art would possess. We additionally note Petitioner accuses Mr. Sugar of being biased in favor of Patent Owner, but has not set forth any formal objection to Mr. Sugar as an expert (*see* Pet. Reply 10) and has not filed a motion to exclude Mr. Sugar's testimony.

Petitioner argues Patent Owner "proposed a level of skill that was preliminarily adopted by the Board in the [Decision to Institute]" but then made a "substantive" change to the level of skill (Pet. Reply 5–6). In particular, Petitioner contends Patent Owner eliminated the reference to electrical wiring in its modified definition because it "suddenly realized it could not have a POSITA that had knowledge and experience in electrical wiring outside of the decorative lighting space, as that contradicted the non-analogous art positions it is taking" (*id.* at 6). Dr. Brown, however, testifies that he did not consider the change removing the express reference to electrical wiring to be significant, that "if you're designing decorative lighting, you have to be designing electrical wiring," and that he considers the term "decorative lighting" in his description of a person of ordinary skill in the art to incorporate electrical wiring (Ex. 1015, 11:15–12:19; Ex. 1014, 25:16–19, 28:5–8.; Ex. 2001 ¶ 14). In view of this, we do not consider the definition Patent Owner proposes in its Response to be substantively different from the definition it proposed in its Preliminary Response, which we adopted in the Institution Decision.

We note that that there is at least some overlap in the parties' proposed definitions of a person of ordinary skill in the art, namely that a person of ordinary skill in the art would have at least a bachelor's degree in electrical engineering, or a comparable field (Pet. 9; PO Resp. 15). Petitioner adds a requirement of five or more years of experience (Pet. 9) while Patent Owner adds "a basic familiarity with circuits used in decorative lighting" (PO Resp. 15). We agree with Patent Owner that five years of decorative lighting experience *in addition to* a degree in electrical engineering or an equivalent subject would not be required to understand the subject matter of the ’588 Patent (PO Resp. 14).

Furthermore, despite Patent Owner proffering two alternative “prongs” in its definition, we understand that these prongs each define the *same* level of skill in the art (Ex. 1015, 11:15–12:19; Ex. 1014, 29:16–30:8 (Dr. Brown testifying that someone with experience can have “a level of familiarity with a product and its design that is equivalent” to someone with a formal education and college degree), 30:20–31:6 (Dr. Brown generally agreeing that a person of ordinary skill in the art could have less education but more specialized experience, or more education and more generalized experience). Further, we note that Dr. Fantone states his opinions would not change if we adopt Patent Owner’s definition of the level of ordinary skill in the art (Ex. 1018 ¶ 13) as did Petitioner in the Oral Hearing (IPR Tr. 9:12–24; PGR Tr. 9:13–23).

We further note the prior art itself demonstrates the level of ordinary skill in the art at the time of the invention (*see Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown” (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)))).

Here, in view of the full record and in light of the competing definitions proposed by the parties, we determine a person of ordinary skill in the art during the relevant timeframe would have (1) at least two years of experience in the design of decorative lighting, or (2) at least a bachelor’s degree in mechanical engineering, electrical engineering, or an equivalent field, and a basic familiarity with circuits used in decorative lighting. For the reasons discussed above, we understand "decorative lighting" to include "electrical wiring" (Ex. 1015, 11:15–12:19; Ex. 1014, 25:16–19, 28:5–8; Ex. 2001 ¶ 14).

B. Claim Construction

In an *inter partes* review we construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc) (*see 37* C.F.R. § 42.100(b) (2019)). Under *Phillips*, claim terms are afforded "their ordinary and customary meaning" (*Phillips*, 415 F.3d at 1312). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention" (*id*. at 1313). "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification" (*id.*). An inventor may rebut that presumption by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision (*In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994)). In the absence of such a definition, limitations are not to be read from the specification into the claims (*In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993)).

Petitioner "submits that no terms require a specific construction" and urges adoption of the "ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent" (Pet. 9 (quoting 37 C.F.R. § 42.100(b) (2018))).

Patent Owner proposes a claim construction for "decorative light string" (PO Resp. 12–14), but proposes constructions for no other terms (*see* PO Resp. 11–14).

1. "decorative light string"

In the Preliminary Response, Patent Owner proposed the term "light string" should be interpreted as "a string of lights that can be positioned over a plurality of branches" (Prelim. Resp. 22). In conjunction with the Preliminary Response, Patent Owner submitted the declaration of Dr. Brown (Ex. 2001). In that Declaration, Dr. Brown construed "a light string to mean: 'a string of lights that can be positioned over a plurality of branches,'" indicating this construction is "consistent with the disclosure[] of the . . . '588 Patent[ ]" (Ex. 2001 ¶ 69).

We declined to adopt Patent Owner's interpretation because it did not include all the embodiments described in the '588 Patent and particularly, limited a light string to "being positioned over branches" (Dec. to Institute 12–13). For the purposes of the Decision to Institute, we construed "'light string' in accordance with its plain and customary meaning consistent with the Specification and Claims of the '588 Patent" (*id.* at 13). We, however, urged the Parties to develop the record further to support any suggested alternative interpretation (*id.*).

In the Response, Patent Owner proposes "a decorative light string" should be construed as "a collection of electric lamps connected by wires in a flexible configuration that is intended to be hung on, draped on, or wrapped around or about an object to provide a decorative effect," relying on the testimony of Mr. Sugar (PO Resp. 12–13 (citing Ex. 2045 ¶¶ 24–28)). As support, Patent Owner relies on the UL 2002 Standards which includes a definition of a "light*ing* string":

> [a] factory-assembled series, series-parallel, or parallel string of replaceable lamps consisting of an attachment plug or current tap, lampholders, lamps, wire, and overcurrent protection. A lighting string optionally may be provided with a load fitting

> (cord connector), a controller, or both. A lighting string is intended to be draped over or around an object to provide a decorative effect. A lighting string may also be a factory-assembled series- or series-parallel string consisting of non-replaceable lamps without shunts, an attachment plug, wire, and overcurrent protection. See 28.1 and 29.1.

(PO Resp. 12 (citing Ex. 1011, 16A)). Although neither "decorative light string" nor "light string" is defined in the UL 2002 Standards, Patent Owner's declarant, Mr. Sugar, testifies "a POSITA would appreciate that the UL 2002 Standards use the terms 'light string' and 'lighting string' interchangeably" (Ex. 2045 ¶ 26 (citing Ex. 1011, 13, 39, 40, 111); PO Resp. 13).

Petitioner responds that Patent Owner relies almost exclusively on extrinsic evidence (Pet. Reply 2) and, particularly, Patent Owner's declarant, Mr. Sugar, "nearly entirely relied upon [] the UL [2002] Standards even though they are not even mentioned in the '588 Patent . . . ignor[ing] the prosecution history . . . [and] improperly inject[ing] the Harris prior art reference" (Pet. Reply 3 (citing Ex. 1017, 28:3–3:12)). Petitioner further contends Mr. Sugar ignores portions of the '588 Patent that contradict the proposed interpretation (*id.*). In particular, Petitioner points to the description in the '588 Patent that teaches "a light string can be applied to a tree and does not require a plug" and "hiding the wires from view, which would include placing the wires within the branches" (*id.* at 3–4).

Initially, we look to the Specification of the '588 Patent and determine the term "light string" is not defined explicitly (*see generally* '588 Patent; Ex. 1017, 35:18–38:17). The '588 Patent does, however, describe many different embodiments. For example, the '588 Patent describes:

> Such flexibility allows reinforced decorative light string **140** to be *attached* to multiple branches and sub-branches of a tree, or

> portions of a *lighted sculpture*, in more creative and flexible ways, and at the same time, display less wire in any particular viewed area of the tree or sculpture

(*id.* at 13:33–38 (emphases added)) and

> One or more reinforced decorative light strings **140**, . . . may be *fastened* or draped onto frame **402**. When reinforced light strings **140** are fastened onto frame **402**, sculpture **400** may include a plurality of frame clips **406** coupling wires 148 of a reinforced decorative light string

(*id.* at 27:21–26).

As emphasized above, the ’588 Patent describes the light string as being "attached" or "fastened," which does not preclude being fixed to another element, including permanently (*see* Dec. to Institute 12). The ’588 Patent further describes:

> Embodiments of reinforced decorative light strings **140** as described above may be applied to artificial trees, *outdoor sculptures, and so on* in order to create safer, stronger, and more attractive decorative lighting products

(*id.* at 17:3–6 (emphasis added)). Thus, the ’588 Patent describes a light string may be applied to artificial trees, sculptures, "and so on" (’588 Patent, 13:33–38, 17:3–6, 17:28–37). The ’588 Patent further describes:

> In the embodiment depicted, tree 200 includes reinforced light strings 140 distributed *about* branches of the various tree sections 202 to 206, with one or more power plugs 142 accessible to a user of tree 200. *In this embodiment*, *reinforced decorative light strings are located externally* on tree sections 202 to 206

(*id.* at 17:28–37 (emphasis added)). Thus, the ’588 Patent describes an embodiment in which the reinforced decorative light strings are located externally on tree sections. We discern no disclosure in the ’588 patent that precludes other embodiments, including ones wherein the reinforced decorative light string is located internally in tree sections 202 to 206. Thus, we are not persuaded "light string" should be read so narrowly as to require the light string to be external to the tree. Additionally, in light of this disclosure, the '588 Patent does not limit a light string to being "a collection of electric lamps connected by wires in a flexible configuration that is intended to be hung on, draped on, or wrapped around or about an object to provide a decorative effect," as proposed by Patent Owner (PO Resp. 13).

Moreover, Patent Owner states "Mr. Sugar[] opined on how a POSITA would construe 'decorative light string' using a number of documents including the '588 Patent and the 2002 UL 588 standards (Ex. 1011) for decorative lighting" (PO Sur-Reply 3). Patent Owner stresses that Mr. Sugar's interpretation of light string is different than the definition in the UL 2002 Standards (*id.* at 4). Neither Patent Owner nor Mr. Sugar, however, provides explicit citation to these "number of documents" except for the '588 Patent and the UL 2002 Standards (*id.*; Ex. 2045 ¶¶ 24–29). Thus, only the UL 2002 Standards are presented as evidence relied upon by Mr. Sugar.

To the extent Patent Owner argues a light string *must be* external to another element on which the light string is hung on, draped on, or wrapped around or about to provide a decorative effect, such as fake tree elements or additional elements, we note Mr. Sugar testifies "[a] POSITA would appreciate that a decorative light string can have *different meanings* depending on the context in which it is used" (Ex. 2045 ¶ 24 (emphasis added)). Looking at the definition of "lighting string" in the UL 200 Standards, Mr. Sugar testifies "[w]hen used in the context of decorative lighting, a POSITA would appreciate that *one* description of a 'decorative light string' as it is used in the '588 Patent is a collection of electric lamps connected by wires in a flexible configuration that is intended to be hung on, draped on, or wrapped around or about an object to give a decorative effect" (*id.* ¶ 27 (emphasis of "one" added; Patent Owner emphasis omitted)). Mr. Sugar further states "[a] light string *can be* affixed permanently to an object to decorate it and not be built into the object" (*id.* ¶ 29 (emphasis added)).

Thus, Mr. Sugar indicates that other descriptions of light strings exist, that the UL 2002 Standards sets forth only one description of a "decorative light string," and that a light string may be permanently affixed to an object. Mr. Sugar also acknowledges the '588 Patent describes how the flexibility of decorative light string allows for the wire to be an attached tree or sculpture while "display[ing] less wire in any particular viewed area of the tree or sculpture" (Ex. 1017, 43:6–15; Ex. 1001, 13:25–38). Therefore, Mr. Sugar's testimony does not support an interpretation requiring a light string to be external to another element on which the light string is hung on, draped on, or wrapped around or about to provide a decorative effect.

Additionally, we do not construe "light string" to prohibit any covering or "decorative element," such as tree needles, on the wire. We are not persuaded, based on the full record, that the claim term should be so limited. Nor are we persuaded that the intended use — "intended to be hung on, draped on, or wrapped around or about an object to provide a decorative effect" — should be imported into the claim interpretation.

Thus, in light of disclosure in the '588 Patent and Mr. Sugar's admissions, based on the record before us, we assign the term "decorative light string" its plain and ordinary meaning to a person of ordinary skill in the art, and construe "decorative light string" as "a collection of electric lamps connected by wires in a flexible configuration." This construction is consistent with the use of the term in the Specification and claims of the ’588 patent.

2. *Other terms*

We determine that we do not need to expressly construe any other terms for purposes of this Decision (*see Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”))).

C. *Asserted Obviousness over Harris and Fujii (and optionally UL 2002 Standards): claims 1–3, 6*

1. *Reference – Harris (Ex. 1008)*

Harris is a patent titled “Artificial Christmas Tree” (Ex. 1008). Harris teaches an artificial Christmas tree including tree lights which are connected to one another via a light circuit (*id*. at 1:15–21). Figure 1 shows such a Christmas tree, and is reproduced below.

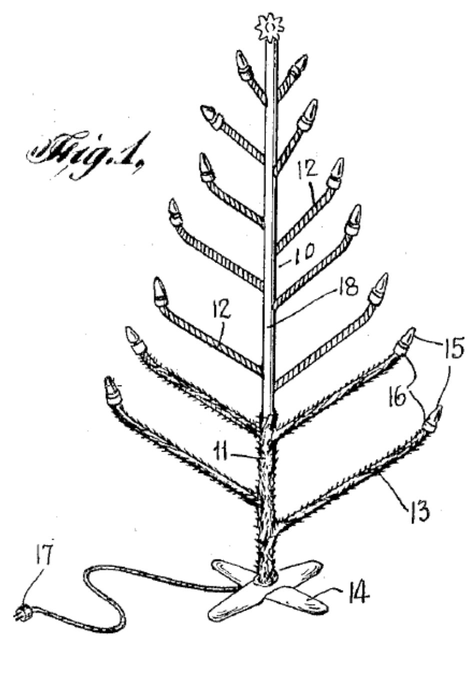


Figure 1 shows a Christmas tree
with lights (Ex. 1008, 1:15–21, 33–36).

As shown, the Christmas tree includes "nine sockets or nine Christmas tree bulbs or tubes 15, the socket 16 constituting an integral part of the ends of the branches 12 or being fixedly secured thereto" (*id*. at 1:77–82). For example, the tree "branches are provided at their ends with sockets . . . for electric light bulbs or tubes" (*id*. at 2:9–11; *see id*. at 2:75–82). Further, the sockets for the bulbs are connected to one another via a "Christmas tree light circuit" with "circuit wires from a plug 17 extend[ing] through the trunk 10 and branches 12 in the separate sockets 16" (*id*. at 1: 77–84). Figure 5 shows such a light circuit and is reproduced below.

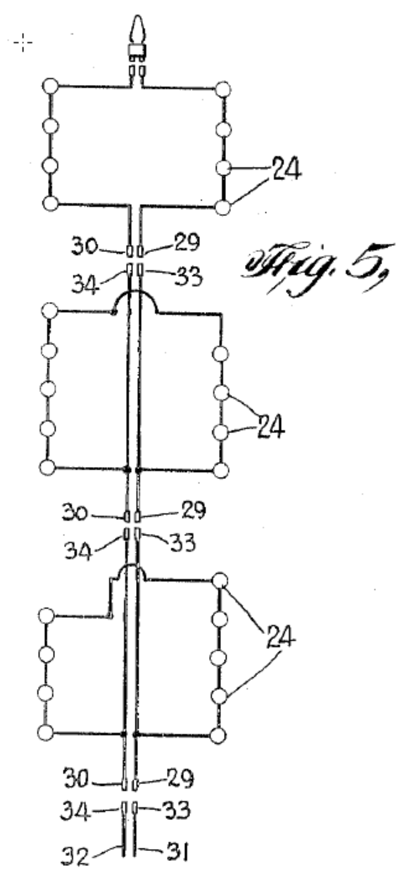


Figure 5 shows a wiring diagram of the
Christmas tree lights (Ex. 1008, 1:49–50).

As shown in Figure 5, "electric current from the wires 31 and 32 may be directly supplied to the Christmas tree light units or circuits of each tree section or unit," e.g., a "top section" (*id*. at 2: 45–52). Harris describes "the wires of [each Christmas tree light unit] extend[s] through the light bulbs 24 in the usual manner" (*id.* at 2: 55–57).

2. Reference – Fujii (Ex. 1004)

Fujii is a patent titled "Wire conductor for harness" (Ex. 1004, code (54)). Fujii teaches a "wire conductor which has high tensile strength and impact resistance as well as high conductivity" (*id*. at 2:18–19). Figure 1 illustrates an embodiment of the wire conductor, and is reproduced below.

FIG. 1

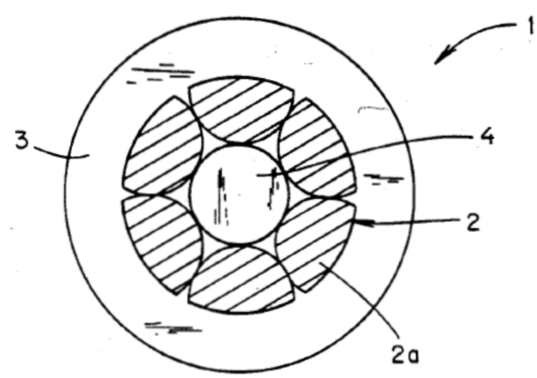


Figure 1 shows a sectional view of a wire conductor (Ex. 1004, 2:50–51).

As shown in Figure 1, the wire conductor, i.e., harness wire 1, "comprises a stranded wire 2, which is formed by arranging strands 2a around an aramid fiber bundle or braid 4" (*id*. at 2:57–60). The aramid fiber bundle 4 can be "prepared from Kevlar fiber . . . of aromatic polyamide" (*id*. at 4:13–15). Further, strands 2a arranged around the aramid fiber bundle 4 can be copper strands (*id*. at 4:12–13).

3. UL 2002 Standards (Ex. 1011)

UL 2002 Standards is a technical standard titled "UL588, Seasonal and Holiday Decorative Products" (Ex. 1011). UL 2002 Standards defines "basic requirements for products covered by Underwriters Laboratories Inc. (UL)" and describes "requirements cover[ing] temporary-use, seasonal decorative-lighting products" including "seasonal lighting strings" (*id*. at 12–13). UL 2002 Standards describes, for certain lighting products, a conductor wire may be "twisted with a non-current carrying polymeric supporting rope" (*id.* at 40 (emphasis omitted)).

4. Alleged Non-Analogous Art – Fujii (Ex. 1004)

Petitioner asserts although "Fujii does not expressly disclose using the wire conductor for decorative lighting purposes, . . . Fujii's reinforced wire would be more than suitable for use in decorative lighting" (Pet. 22 (citing Ex. 1012 ¶ 35)). Petitioner contends Fujii "disclose[s] conductive wires for products that require electricity and connect resistive elements"; thus, Petitioner asserts, Fujii is "in the same field of endeavor" as the invention claimed in the '588 Patent, and, therefore, constitutes analogous art to the '588 Patent (*id*. (citing Ex. 1012 ¶ 36)).

Patent Owner argues "Fujii is not analogous to Harris or the subject matter of the '588 Patent" (PO Resp. 46).

The scope of analogous prior art is defined as: "(1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved" (*In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004)).

Patent Owner contends, "Fujii is from a different field of endeavor as the claimed invention" and more specifically, "Fujii is directed to automobile wiring" even though "Fujii discusses a wire harness for an automobile as 'an example'" (PO Resp. 48 (emphasis omitted) (citing Ex. 1004, 1:40–47, 2:36–42, 2:50–3:47, 4:19–46, Table 1, 5:18–6:16, Table 3, 6:51, 7:18–25)). Patent Owner further argues, "a POSITA looking at Fujii would not equate the 'fields of endeavor' of automobile harness design with designing wiring for decorative lighting" (PO Resp. 48). According to Patent Owner, "[a]utomobiles are designed to be robust in all environments and to avoid failure given that the need for safety of the traveling public is paramount [and] decorative lighting is designed typically for temporary or seasonal use [that is] largely stationary" (*id.*). Thus, Patent Owner contends, "[c]ost and electrical wire safety considerations are more important than making sure the decorative lighting works every time, like an automobile" (*id.* at 48–49).

As Patent Owner correctly states, the Federal Circuit in *Bigio* held that the field of endeavor test for analogous art "requires the PTO to determine the appropriate field of endeavor by reference to explanations of the invention's subject matter in the patent application, including the embodiments, function, and structure of the claimed invention" (*Bigio*, 381 F.3d at 1325; PO Sur-Reply 12). Despite quoting this portion of *Bigio* in its Sur-Reply, Patent Owner seemingly focuses only on the end-use of the subject matter described in the '588 Patent, namely decorative lighting. The "explanations of the invention's subject matter" in the '588 Patent, however, extend beyond "decorative lighting."

In particular, the title, Abstract, and Field of Invention in the '588 Patent each refer to reinforced wiring (Ex. 1001, code (54), Abstract, 1:1–2, 13–17). The ’588 Patent states that “[w]ires used in decorative lighting typically include an electrical conductor surrounded by an insulating material. The electrical conductor usually comprises multiple, individual strands of copper conductors” (Ex. 1001, 1:26–30). Additionally, the ’588 Patent contains several figures depicting the structure of its wires, and describes several embodiments of its reinforced wires (*see, e.g.*, Ex. 1001, 2:34–59, Figs. 3, 4A–4C, 6, 4:56–9:67). Although the ’588 Patent is directed to the use of this reinforced wiring in decorative lighting, it is clear that at least some of the “the embodiments, function, and structure of the claimed invention” focus on the wiring itself.

Consistent with the holding in *Bigio*, Petitioner’s characterization of the field of endeavor is not limited by, or based on, the end-use of the wire. In particular, Petitioner asserts, “[t]he references both disclose conductive wires for products that require electricity and connect resistive elements, and are in the same field of endeavor” (Pet. 22 (citing Ex. 1012 ¶ 36) (citations omitted)). Indeed, Fujii’s title is “Wire Conductor for Harness” (Ex. 1004, cod (54)). Fujii does not limit its invention to automobiles, and in particular, does not limit its claims to automobiles (*see* Ex. 1004, code (54), Abstract, 7:39 (Claim 1, “A wire conductor for a harness”), (Claim 8, “A method of forming a wire conductor”)). Thus, the wires of Fujii and the ’588 Patent both share common fundamental features associated with electric wiring, namely an electrical conductor, often comprised of multiple, individual strands of copper surrounded by an insulating material (*see, e.g.*, Ex. 1001, 1:26–30; Ex. 1004, 1:16–22, 1:48–54, 1:62–2:2)). We determine an ordinarily skilled artisan would understand Fujii and the ’588 Patent are in the same field of endeavor because they all disclose a conductive wire for products requiring electricity and connecting various resistive elements.

Patent Owner further argues, "a POSITA consulting the UL [2002] Standards will find no reference to internally reinforced wire, such as the wire of Fujii" (PO Resp. 49). According to Patent Owner, the "absence of internally reinforced wire is important, because Fujii issued in 1993, which is about 9 years before the UL [2002] Standards published (2002) and roughly 20 years before the 2013 effective filing date of the '588 Patent" (*id.*). Thus, Patent Owner concludes, "the UL Standards are evidence that internally-reinforced wire was not in use or recognized as a design option by the decorative lighting manufacturing industry at least as of the effective filing date of the '588 Patent (Sep. 13, 2013), solidifying the conclusion that Fujii is from a different field of endeavor" (*id.* (citing Ex. 2041 ¶ 74)).

The test is whether the cited prior art is from the same field of endeavor as the patent at issue (*see Bigio* at 1325) not whether the prior art (Fujii) would have been obvious in light of other prior art (UL 2002 Standards).

Patent Owner further argues, "Petitioner's categorization of 'the same field of endeavor' is overly broad because Fujii's field of endeavor is in the context of improving a specific design of automobile harnesses for automobile applications, as opposed to improvements to decorative lighting" (PO Resp. 49–50 (citing Ex. 2041 ¶ 75)). As set forth *supra*, Fujii does not limit itself to automobiles and especially does not limit the invention in its title, abstract, summary, description, or claims (Ex. 1004, code (54), Abstract, 1:2, 1:40–8:53), none of which are limited to automobiles. We agree with Petitioner that both references are directed to "conductive wires for products that require electricity and connect resistive elements" (*see* Pet. 22).

Petitioner further contends "[Patent Owner] cited prior art references relating to electrical wiring outside of decorative lighting during prosecution of the '588 Patent" (Pet. Reply 9 (citing Ex. 1002, 174; Ex. 1021)). Petitioner emphasizes "when the Examiner applied a non-decorative lighting reference to the claims during prosecution, [Patent Owner] did not raise a non-analogous art argument" (*id.* (citing Ex. 1002, 47–64)). We will not speculate as to Patent Owner's strategy to not make this argument during prosecution. Additionally, Patent Owner notes that Petitioner cites to no authority in support of its arguments, asserts that there is no requirement that a patent applicant make every argument during prosecution, and argues that citation in an information disclosure statement is not an admission of relevance of the cited reference (PO Sur-Reply 15–16 (citing MPEP § 2266.01; 37 C.F.R. §1.97(h))).

Nor are we persuaded by Patent Owner's argument that "[t]he field of invention of the '588 Patent is decorative lighting, and 'decorative light string' is recited in every claim in this IPR" (*id.* at 12 (citing Ex. 1001, 1:12–13)) such that the term "decorative," for lighting limits the field of endeavor. Patent Owner further argues Petitioner's theory "fails because the second prong of [Patent Owner's person of ordinary skill in the art] definition never included simply 'electrical wiring'" (*id.* at 14). Even if we were to agree with Patent Owner that the appropriate field of endeavor is "decorative lighting," the outcome here would not change. Dr. Brown testified that "if you're designing decorative lighting, you have to be designing electrical wiring," and that decorative lighting "incorporates [ ] electrical wiring" (Ex. 1015, 11:15–12:22; Ex. 1014, 25:16–18, 28:5–8). Dr. Fantone agreed, testifying that '[d]ecorative lighting design necessarily involves design of electrical wiring" (Ex. 1018 ¶ 15). Thus, declarants from both parties agree that decorative lighting and electrical wiring are inexorably intertwined, which undermines Patent Owner's arguments that Fujii, a reference addressing electrical wiring, is from a different field of endeavor than the '588 Patent.

Thus, based on the record before us, we determine Harris[2] and Fujii, are from the same field of endeavor as the '588 Patent and therefore, are analogous art that qualifies as prior art for an obviousness determination.

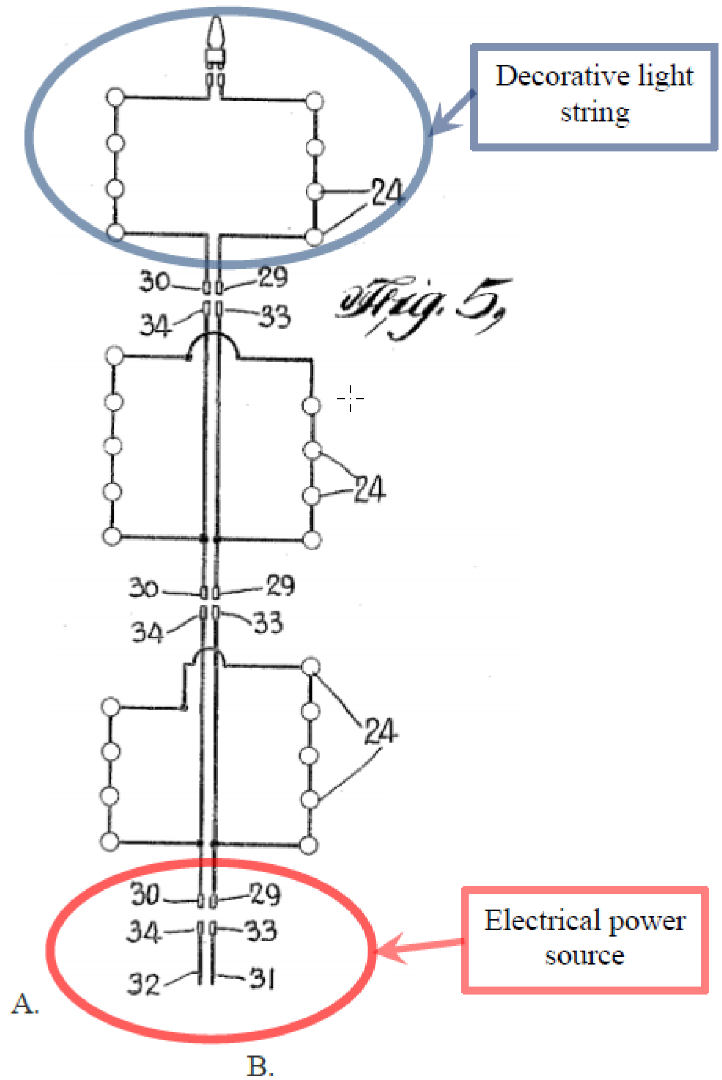
5. Analysis of Claim 1

a) "light string"

Petitioner relies on Harris to teach the recited "light string" (Pet. 19–21). In particular, Petitioner asserts Harris, in Figure 5, reproduced below

[2] Patent Owner does not dispute that Harris and the '588 Patent are from the same field of endeavor.

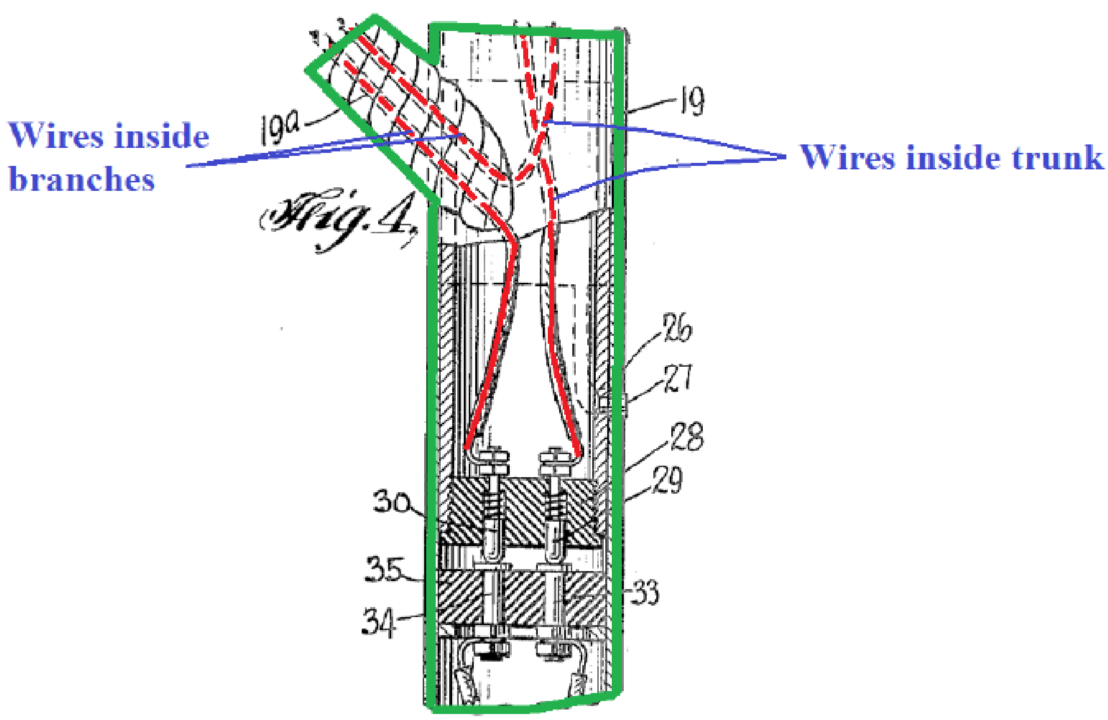
and annotated by Petitioner, illustrates light circuits which include a plurality of light bulbs 24 connected together by electrical wires (*id.* at 19).



(Pet. 21 (quoting Ex. 1008, Fig. 5 (annotated)). Figure 5 is a "diagrammatic wiring diagram of the several Christmas tree light units employed in the construction" of a tree shown in Figure 3 of Harris (Ex. 1008, 1:42–44, 49–52). According to Petitioner, "[e]ach of the light circuits represents a decorative light string as part of Harris's artificial Christmas tree" (Pet. 19).

Patent Owner argues "[a] POSITA would understand that Harris does not teach or employ decorative light strings under the Patent Owner's proposed construction nor under the UL 2002 Standards description" (PO Resp. 40 (citing Ex. 2045 ¶¶ 31–33)).

Patent Owner argues "Harris' bulbs 24 in fixed sockets 23 that are built into the artificial branches 12 of the top (19), middle (21), and bottom (20) sections of the artificial tree of FIG. 3 is not hung on, draped on, or wrapped around or about an object, and is therefore not a decorative light string" (*id.* (citing Ex. 1008, 1:102–2:74; Ex. 2041 ¶ 61; Ex. 2045 ¶¶ 30–33)). Patent Owner annotates Figure 4 of Harris (*id.* at 40), reproduced below, to illustrate "the wires are disposed inside the trunk of the tree and inside hollow portions of the tubing 19a which represent the branches of the tree" (*id.* at 39–40 (citing Ex. 2045 ¶ 61)):



(Ex. 1008, Fig. 4 (annotated by Patent Owner)). Figure 4 is an annotated illustration of a "sectional detail view of an electric coupling and tree section coupling" (Ex. 1008, 1:40–48).

As set forth above, however, we declined to adopt Patent Owner's proposed construction of decorative light string. Rather, we construe "decorative light string" as "a collection of electric lamps connected by wires in a flexible configuration." Based on this construction, we agree with Petitioner that Harris teaches or suggests a decorative light string based on its disclosure of light circuits which include a plurality of light bulbs 24 connected together by electrical wires. Additionally, Harris states its invention comprises "a plurality of branches . . . movable relatively thereto, said branches being composed of flexible material" (Ex. 1008, 1:4–9). In the claimed invention, Harris does not recite the wiring is integral to the tree (*id.* at 3:104–126). Indeed, the claimed invention recites each unitary section comprises a wiring system including the lights, "and readily detachable and attachable electrical connections at the ends of the trunk portions" (*id.*). Harris further describes "each section . . . and each Christmas tree light unit is independent of the other" (*id.* at 3:53–55). Thus, Harris describes each section is flexible and independent.

Harris additionally discloses the separate sections "will be covered or ornamented . . . to represent as near as possible the natural tree" (*id.* at 3:59–66) and the branches are "covered by a suitable imitation fir or Christmas tree branch construction 13 to represent as near as possible the natural tree" (*id.* at 2: 68–71). This covering is described as ornamental, not functional. Ornamental covering does not change that Harris is teaching a string of lights.

Harris further describes circuitry that is included in flexible tubings, as shown in Figure 4 (*id.* at 2:1–14). Harris does not describe of what the tubing is comprised. Rather, Harris describes the branches are "preferably composed of flexible tubes *or cables*" (*id.* at 2:64–65 (emphasis added)). As such, Harris describes branches that could be cables, i.e., they would not have an internal opening. Harris also describes the Christmas tree bulbs or tubes 15, shown in Figure 1 and sockets 16 "constituting an integral part of the ends of the branches 12 *or being fixedly secured thereto*" (*id.* at 2:78–82). Thus, Harris describes the branches may be cables and the sockets and bulbs (or tubes) may be fixedly secured thereto and Harris does not preclude wiring external to the cable/branch. Therefore, Harris is not limited to circuitry being inside the tubing (*see e.g.,* Ex. 1008, 3:124–126).

Moreover, as noted by Petitioner (Pet. Reply 5), the '588 Patent describes "[i]n this embodiment, reinforced decorative light strings are located externally on tree sections 202 to 206" (Ex. 1001, 17:28–37). Additionally, neither the '588 Patent Specification or its claims prohibits additional protection or decorations for the "light string" or prohibits any other non-functional element (*see generally* Ex. 1001).

Patent Owner proffers new arguments for the first time in its Sur-Reply (PO Sur-Reply 7–8). In particular, Patent Owner, argues the preamble of claim 1 is limiting, and requires "[a] reinforced decorative light string . . . for use *on* an artificial lighted tree . . . not *in* it," which Harris does not teach (PO Sur-Reply 7; Ex. 1001, claim 1). Patent Owner's argument purportedly is in response to Petitioner's assertion regarding the construction of the term "decorative light string." Patent Owner's argument, however, is directed to differences between Harris and the '588 Patent and is not responsive to Petitioner's arguments, but rather, introduces new arguments. "Sur-replies should only respond to arguments made in reply briefs, comment on reply declaration testimony, or point to cross-examination testimony" (Patent Trial and Appeal Board Consolidated Trial Practice Guide, 73–74 (November 2019), available at https://www.uspto.gov/TrialPracticeGuideConsolidated). Nevertheless, even if we were to agree with Patent Owner's argument regarding the preamble being limited, as discussed above, we find that Harris is not limited to circuitry being inside the tubing.

Patent Owner additionally proffers additional arguments in the Sur-Reply directed to the differences between the description in the '588 Patent and Harris and, in particular, regarding the "hiding wires from view" (PO Sur-Reply 8 (citing Pet. Reply 4; Ex. 1001, 13:50–58).

These are new arguments are proffered for the first time in the Sur-Reply. These arguments do not properly reply to Petitioner's arguments directed to interpretation of the term "light string" (Pet. Reply 2–5). Even if we were to consider the argument, Patent Owner provides no support for their conclusory statement regarding what a POSITA would understand about Harris' light circuit (PO Sur-Reply 8).

Based on the record developed at trial, Petitioner has shown the combination of Fujii and Harris teaches "[a] reinforced decorative light string," as recited in claim 1.

b) Other Limitations

Petitioner has set forth where the combination of Harris and Fujii teaches or suggests the remaining limitations of claim 1 (Pet. 24–25). More specifically, Petitioner contends Harris teaches: "a plurality of lamp assemblies, including a first lamp assembly, a plurality of intermediate lamp assemblies, and a second lamp assembly, each of the plurality of lamp assemblies including a lamp element having a first lead and a second lead" and "a first power wire electrically connected at a first end to a first lead of a lamp element of a first lamp assembly and configured to be electrically connected at a second end to the electrical power source of the lighted artificial tree" (Pet. 24–26 (citing Ex. 1008, 2:9–11, Fig. 5; Ex. 1012 ¶¶ 42–45)); and "a second power wire electrically connected at a first end to a second lead of a lamp element of a second lamp assembly and configured to be electrically connected at a second end to the electrical power source of the tree" (*id.* at 29–30 (citing Ex. 1008, 2:9-11, Fig. 5; Ex. 1012 ¶¶ 51–53)). Petitioner additionally contends the combination of Harris and Fujii teaches "a plurality of reinforced light-connecting wires, each reinforced light-connecting wire electrically connected at a first end to one of the intermediate lamp assemblies and electrically connected at a second end to another of the intermediate lamp assemblies, each of the plurality of light-connecting wires" (*id.* at 31–32 (citing Ex. 1008, 1:82–84, 2:45–48, Figs. 4–5; Ex. 1004, 2:18–22; Ex. 1002, ¶¶ 33–40, 45)). Petitioner further asserts Fujii teaches "an axially-extending reinforcing strand including a polymer material" (*id.* at 32–33 (citing Ex. 1004, 2:20–21, Fig. 1; Ex. 1012 ¶¶ 58–59)); "a conductor layer including a plurality of axially-extending conductors adjacent the reinforcing strand, each of the plurality of axially-extending conductors comprising a copper material" (*id.* at 33–34 (citing Ex. 1004, 2:58–60, 4:12–13, Fig. 1; Ex. 1012 ¶¶ 61–62)); and "an outer insulating layer enveloping the conductor layer and the reinforcing strand" (*id.* at 35 (citing Ex. 1004, 2:61–63; Ex. 1012 ¶¶ 64–64)).

Based on our review of the full record before us, we are persuaded Petitioner has shown the combination of Harris and Fujii teaches or suggests the remaining limitations of claim 1.

c) Rationale to combine

Petitioner asserts Fujii discloses "a wire conductor which has high tensile strength and impact resistance as well as high conductivity by composing the aramid fiber bundle or braid having extremely high tensile strength and impact resistance with the strands having high conductivity" (Pet. 21–22 (quoting Ex. 1004, 2:18–22)). Petitioner further contends "the structure of Fujii as the electrical circuit wires connecting Harris's lights 24 is simply combining prior art elements according to known methods to yield predictable results" (*id.* at 23 (citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007); Ex. 1012 ¶ 37)). Petitioner additionally asserts an ordinarily skilled artisan would have found it "obvious to modify Harris's electrical circuit wires to include a reinforced wire, such as taught by Fujii, because such a modification involves a simple substitution of one known element for another to obtain the predictable results of a more durable decorative-lighting wire" (Pet. 23 (citing *KSR*, 550 U.S. at 416; Ex. 1012 ¶ 38)).

In response, Patent Owner argues "the Petition fails to provide any evidence that Harris would benefit from more durable wires, that the wires of Harris were insufficiently strong for their intended purpose, or that the problem faced by the inventor of the '588 Patent was 'insufficient strength of the wires for their intended purpose'" (PO Resp. 42 (citing Pet. 22; Ex. 1012 ¶ 36)). According to Patent Owner, "Petitioner has not identified with particularity any evidence to support the ground of obviousness based on insufficient strength of the wires" (*id.*). Patent Owner argues "the electric circuit wires of Harris must be decorative lighting wires, and must therefore be performing the function of 'use in decorative lighting' [and, as] such, the decorative wires of Harris must [] already be sufficiently strong and durable" (*id.* (citing Pet. 19; Ex. 2041 ¶ 65)). Additionally, Patent Owner argues Harris' wires "do not experience substantial axial of pulling forces" (PO Resp. 43).

We are persuaded by Petitioner's contention that an ordinarily skilled artisan would seek to reinforce Harris' wire. In this regard, Petitioner's expert testifies:

> Harris includes Christmas tree light circuits (e.g., light strings) that are provided in the branches 12 of Harris's artificial Christmas tree, which branches 12 include flexible tubes or cables that are designed to bend, flex, etc., e.g., to facilitate storage or shipment of Harris's artificial Christmas tree. Such flexing and bending of Harris's braches 12 is likely to result in stresses from multiple directions exerted on the wires of the tree light circuits. This stress often can result in strain and breakage of the wiring in the tree light circuits (i.e., light strings). For example, repeated bending and flexing of these branches 12 can result in breakage or other strain related damage to the wires of Harris's tree light circuits

(Ex. 1012 ¶ 38 (citation omitted)). We credit Dr. Fantone's statement because Harris describes branches that are "composed of flexible material" and may be moved into a collapsed position (Ex. 1008, 1:7–8, 2:64–68). We are further persuaded that, in light of Dr. Fantone's testimony, in extending the tree branches and collapsing the tree branches, the branches of Harris' tree will bend, flex, and be pulled in various directions.

We disagree with Patent Owner's argument that "Petitioner offers no credible rationale for why a [person of ordinary skill in the art] would seek to reinforce wire that was housed within a structure" (PO Resp. 43). Harris does not set forth detail about the tubing. Indeed, Harris does not describe the tubing's composition except to indicate it is "flexible" (Ex. 1008, 3:1–6). Thus, Harris does not provide disclosure indicating the tubing would *prevent* bending, flexing, or twisting of branches that could result in breakage.

Patent Owner further contends an ordinarily skilled artisan "would also expect that the wires would not be subject to axial or pulling forces due to bending of the branches, as the Harris tree is designed to have movable branches, such that the wire lengths would be sufficiently long to accommodate bending and movement of the branches without pulling on the wires" (PO Resp. 43 (citing Ex. 2041 ¶ 67)). Harris, however, does not teach or suggest any aspect of wire lengths. Accordingly, we are persuaded an ordinarily skilled artisan would have had reason to modify Harris to provide "a more durable decorative-lighting wire" (*see* Pet. 23).

Petitioner asserts that an ordinarily skilled artisan would have found it obvious "to modify Harris's electrical circuit wires to include a reinforced wire, such as taught by Fujii, because such a modification involves a simple substitution of one known element for another to obtain the predictable results of a more durable decorative-lighting wire" (Pet. 23 (citing *KSR*, 550 U.S. 416; Ex. 1012 ¶¶ 37, 38)). In particular, based on the full record, we are persuaded an ordinarily skilled artisan would have found substituting Harris' wire with Fujii's reinforced wire would have been a simple substitution predictably producing a more durable wire.

Patent Owner further argues Petitioner's argument that "employing the structure of Fujii as the electrical circuit wires connecting Harris's lights 24 is 'simply combining prior art elements according to known methods to yield predictable results'" . . . is not correct" (PO Resp. 44–45 (citing Pet. 23; Ex. 2041 ¶ 69)). Again, Patent Owner argues that Fujii's top of the conductor area range of 0.3 mm^2 "is significantly thinner than the thinnest wire the UL Standards allow for serial-wired decorative lighting" (*id.* at 45 (Ex. 1004, 1:9–14; Ex. 1011, 40)). According to Patent Owner, then, "a POSITA would appreciate that combining Fujii and Harris would require using an increased wire size in Harris that is outside the scope of wires known and accepted by Fujii — a size that is in fact discouraged by Fujii"

(PO Resp. 45 (citing Ex. 1004, 2:9–14)). Patent Owner's declarant, Dr. Brown, testifies that given Fujii's size "a POSITA would appreciate that Fujii requires thinner wire than what the manufacturing industry allows for and was tested and approved. It is therefore not within the scope of 'known methods to yield predictable results'" (Ex. 1001 ¶ 86).

Patent Owner appears to be arguing Fujji must be bodily incorporated into Harris.

> To justify combining reference teachings in support of a rejection it is not necessary that a device shown in one reference can be physically inserted into the device shown in the other. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

(*In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (citations omitted)).

Petitioner, however, does not argue incorporating a wire of Fujii's specific dimensions (Pet. 21–24). Rather, Petitioner relies on Fujii to teach "a wire conductor which has high tensile strength and impact resistance as well as high conductivity by composing the aramid fiber bundle or braid having extremely high tensile strength and impact resistance with the strands having high conductivity" (*id.* at 21–22 (quoting Ex. 1004, 2:18–22)).

In other words, Petitioner relies on Fujii to teach the use of reinforced wires for Harris' light connecting wires (*id.* at 32). We credit Dr. Fantone's testimony that "[a] POSITA [thus] would be motivated to combine the teachings of Harris and Fujii in order to modify the tree light circuits of Harris to increase the durability while maintaining the weight and diameter of the light strings" (Ex. 1012 ¶ 38) because Fujii expressly teaches a wire conductor which has high tensile strength and impact resistance (*see* Ex. 1004, 2:18–22).

A skilled artisan is "a person of ordinary creativity, not an automaton" (*KSR*, 550 U.S. at 421). Here, we are not persuaded an ordinarily skilled artisan would have found it uniquely challenging or otherwise beyond the level of ordinarily skilled artisans to substitute one type of conducting wire for another with higher tensile strength and impact resistance. As such, we find this enhancement would have been obvious (*see id.* at 417 (noting that if a technique has been used to improve one device, and an ordinarily skilled artisan would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill); *see also Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007)). We credit Dr. Fantone's testimony that an ordinarily skilled artisan would have found it "easy . . . to connect Fujii's conductor strands 2a to the terminals of Harris's light bulbs 24, as well as to the connectors 30 and 29 in plug 28" (Ex. 1012 ¶ 37). Indeed, "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ" (*KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006))).

Thus, based on the record developed during trial, we are persuaded Petitioner has articulated reasoning with a rational underpinning as to why an ordinarily skilled artisan would have been motivated to combine the teachings and suggestions of Harris and Fujii.

Accordingly, based on the record developed at trial, Petitioner has articulated reasoning with a rational underpinning as to why an ordinarily skilled artisan would have had reason to combine the teachings and suggestions of Harris and Fujii.

d) Asserted Objective Indicia of Non-Obviousness

Patent Owner contends the subject matter of the ’588 patent claims is not obvious because the technology allegedly described in the ’588 Patent has become an industry standard, having been adopted in the 2015 and 2018 versions of Underwriters Laboratories Standards for Safety for Seasonal and Holiday Decorative Products UL 588 (PO Resp. 27–30, 69–70). More specifically, Patent Owner asserts “in addition to becoming an industry standard in UL 588, the patented internally reinforced wire has been adopted by fifteen companies making products that comply with the CWTX-S standard that corresponds to the claimed invention” (PO Resp. 70 (citing Ex. 2051)). Exhibit 2051 provides a UL Product iQ search on the keyword “CXTW-S” and a listing of 16 results showing a document name, company name, and UL CCN Description (Ex. 2051, 1). Patent Owner, however, has not identified anything in the record linking adoption of this standard to Patent Owner’s conduct or the ’588 patent. For example, Patent Owner does not direct us to evidence in the record showing the new standards set forth in the 2015 and 2018 versions of UL 588 were based on Patent Owner’s patent, patent application, or other Patent Owner submitted information (*see generally* PO Resp.). Nor has Patent Owner proffered sufficient evidence or argument as to the timing of such a submission and adoption in UL 588.

Patent Owner argues that “[t]he Federal Circuit has repeatedly held that industry adoption of a standard with a nexus to a claimed invention is strong evidence of non-obviousness,” and cites to several cases to support this assertion (PO Resp. 68–70). The cases upon which Patent Owner relies, however, are all distinguishable from the facts in this proceeding.

In *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340 (Fed. Cir. 2012), in addition to evidence regarding adoption of an industry standard, the Patent Owner presented extensive evidence of commercial success, industry praise, unexpected results, copying, industry skepticism, licensing, and long-felt but unsolved need. Indeed, the Court found:

> Few cases present such extensive objective evidence of nonobviousness, and thus we have rarely held that objective evidence is sufficient to overcome a prima facie case of obviousness. . . .
>
> This, however, is precisely the sort of case where the objective evidence "establish[es] that an invention appearing to have been obvious in light of the prior art was not."

(*Transocean Offshore Deepwater Drilling*, 699 F.3d at 1354–55 (alteration in original)). Here, Patent Owner has not presented any such "extensive objective evidence." Rather, Patent Owner has provided only the collection of documents in Exhibit 2051 that do not constitute evidence of commercial success, industry praise, unexpected results, copying, industry skepticism, licensing, and long-felt, but unsolved need. Exhibit 2051 is a thirty-seven page exhibit that contains a number of different documents without sufficient explanation as to its relevance (Ex. 2051).

Similarly, in *Rolls-Royce, PLC v. United Techs. Corp.*, 603 F.3d 1325, 1340 (Fed. Cir. 2010), the district court found the invention non-obvious based on more extensive evidence than that proffered here. More specifically, the parties did not dispute that the Rolls-Royce Trent 8104 engine "was the very first commercially available engine with fan blades with forward-rearward-forward sweep" and that the engine satisfied a long-felt need based on the evidence (*Rolls-Royce*, 603 F.3d at 1340). Additional evidence such as appearing on the cover of a magazine, testified to be an unusual event, commercial success as shown by "a nexus between the commercial success and the patentably distinct feature of the invention" were also proffered (*id.*). Here, Patent Owner has presented no evidence but instead simply asserts "the motivation for adoption is the advantage provided the invention" (PO Resp. 70).

Accordingly, Patent Owner has not persuaded us "the secondary considerations of non-obviousness weigh against" finding the combination of teachings renders the patent obvious.

e) Conclusion

For all of the foregoing reasons, we conclude Petitioner has established by a preponderance of the evidence that the subject matter of claim 1 would have been obvious over the teachings of Harris and Fujii (and, optionally, the UL 2002 Standards).

6. Dependent Claims 2, 3, and 6

Petitioner contends the combination of Harris and Fujii (and optionally UL Standards) teaches claims 2, 3, and 6, which depend from claim 1 (Pet. 36–39). Petitioner has directed us to portions of the cited references that teach or suggest all of the limitations recited in the claims (*id.*).

Patent Owner makes no additional arguments as to these claims other than the arguments addressed above as to claim 1 (PO Resp. 53).

Based on the record before us, and review of Petitioner's contentions, we are persuaded Petitioner has shown the combination of references teaches or suggests all of the limitations in claims 2, 3, and 6, and Petitioner has demonstrated that a person of ordinary skill in the art would have had reason to combine the teachings and suggestions of the references.

7. Conclusion

Based on the record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that the subject matter of claims 1–3 and 6 would have been obvious over the teachings of Harris and Fujii (and, optionally, the UL 2002 Standards).

D. Asserted Obviousness over Harris, Fujii, (and optionally UL 2002 Standards), and Bowden: claims 4 and 5

1. Reference – Bowden (Ex. 1009)

Bowden is a patent titled "Crimp Terminal for Aluminum Wire" (Ex. 1009, code (54)). Bowden describes "a crimp terminal which is satisfactory for use with aluminum wires, and which also may be used with copper wires" (*id.* at 1:64–67). In particular, a "crimp-on terminal 10" attaches onto a conductor wire (*id.* at 2:62–66, 3:30–31; *see id.* Figs. 1–2).

2. Analysis

Petitioner sets forth the combination of Harris, Fujii, (and, optionally, UL 2002 Standards), and Bowden teaches claims 4 and 5 (Pet. 39–41). Petitioner has directed us to portions of the cited references that teach or suggest all of the limitations recited in the claims (*id.*). Petitioner also argues that a person of ordinary skill in the art would have had a reason to combine the teachings of Bowden with those of Harris and Fujii (*id.*)

Patent Owner makes no additional arguments as to these claims other than the arguments addressed above as to claim 1 (PO Resp. 53).

Based on the record before us and review of Petitioner's contentions, we are persuaded Petitioner has shown the combination of references teaches or suggests all of the limitations in claims 4 and 5, and Petitioner has demonstrated adequately that a person of ordinary skill in the art would have been motivated to combine the teachings and suggestions of the references. Accordingly, based on the record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that the subject matter of claims 4 and 5 would have been obvious over the teachings of Harris, Fujii, and Bowden (and, optionally, the UL 2002 Standards).

E. Asserted Obviousness over Lin and Fujii (and optionally UL 2002 Standards): claims 7–10, 12, 14, 15, 17, and 18

1. Reference – Lin (Ex. 1003)

Lin is a patent application publication titled "Lamp String" (Ex. 1003, code (54)). Lin describes a lamp string for use on items such as a Christmas tree (*id.* ¶¶ 5, 8). Figure 4 shows such a lamp string, and is reproduced below.

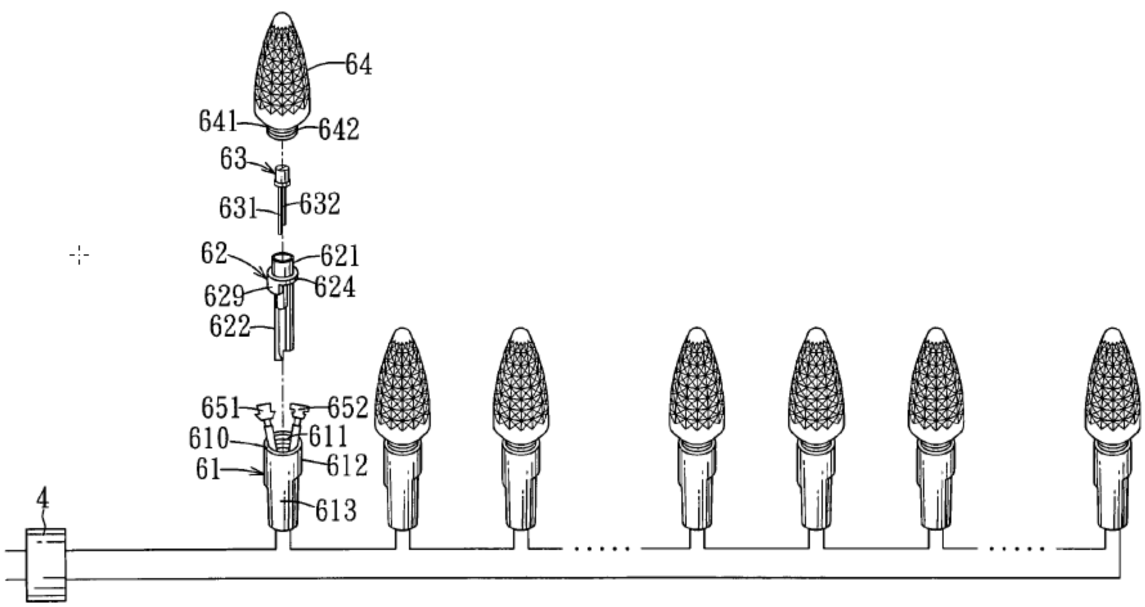


FIG. 4

Figure 4 shows a partly exploded perspective view of a lamp string (Ex. 1003 ¶ 14).

As illustrated in Figure 4, lamp string 1 includes "a plurality of bulb mounting units arranged together with the plug 4 electrically in series with each other" (*id.* ¶ 27). Further, "light-emitting units 63 [are] mounted respectively on the bulb mounting units" (*id.*). Even further, "first and second conductive contacts 651, 652 mounted in the receptacle 61" of the bulb mounting unit are connected electrically and respectively to electric wires connecting the bulb mounting units to electrical power in a series circuit (*id.*; *see id.* ¶ 29).

2. Alleged Non-Analogous Art

Petitioner asserts Fujii and Lin are analogous art to the '588 Patent (Pet. 48). In particular, Petitioner contends Fujii discloses "conductive wire[] for products that require electricity and that connect resistive elements"; therefore, according to Petitioner, Fujii "is in the same field of endeavor" as the '588 Patent (*id.* (citing Ex. 1012 ¶ 96)).

Patent Owner proffers similar arguments regarding Fujii as proffered with respect to the asserted grounds of obviousness over Harris and Fujii set forth above (PO Resp. 46–53, 61–62).

For the reasons set forth *supra,* based on the record before us, we determine Fujii is analogous art.

3. Analysis of Claim 7

a) Limitations

Petitioner contends Lin and Fujii, (and, optionally, UL 2002 Standards) teaches a "reinforced decorative light string," as recited in claim 7 (Pet. 41–42 (citing Ex. 1003 ¶ 5)). More specifically, Petitioner contends Lin teaches, as recited in claim 7, "a plurality of lamp assemblies, each of the plurality of lamp assemblies including a lamp element having a first lead and a second lead" (*id.* at 43–44 (citing Ex. 1003 ¶ 27, Fig. 4)); "a first power wire electrically connected to at least one of the plurality of lamp assemblies" (*id.* at 44–45 (citing Ex. 1003 ¶¶ 27, 29, Fig. 4)); and "a second power wire electrically connected to at least one of the plurality of lamp assemblies" (*id.* at 46 (citing Ex. 1003, Fig. 4)). Petitioner further contends the combination of Lin and Fujii, (and, optionally, UL 2002 Standards), teaches "a plurality of reinforced light-connecting wires, each reinforced light-connecting wire electrically connected to at least two of the plurality of lamp assemblies," as recited in claim 7 (Pet. 47–50 (citing Ex. 1003, Fig. 4; Ex. 1004, 2:18–22, Fig. 1; Ex. 1011, 40)). Additionally, Petitioner contends Fujii teaches, as recited in claim 7, "each of the plurality of light-connecting wires including: an axially-extending reinforcing strand including a polymer material" (Pet. 50–51 (citing Ex. 1004, 2:20–21, Fig. 1)); "a conductor layer including a plurality of axially-extending conductors adjacent the reinforcing strand, each of the plurality of axially-extending conductors comprising a copper material" (*id.* at 51–52 (citing Ex. 1004, 2:58–60, 4:12–13, Fig. 1)); and "an outer insulating layer enveloping the conductor layer and the reinforcing strand" (*id.* at 52–53 (citing Ex. 1004, 2:61–63, Fig. 1)).

Based upon review of the record before us, Petitioner has shown the combination of Lin and Fujii teaches or suggests the elements of claim 7.

b) Rationale to Combine

Petitioner further contends an ordinarily skilled artisan would have found it obvious to combine Lin, Fujii, and, optionally, the UL 2002 Standards (Pet. 48–50). According to Petitioner, "employing the structure of Fujii as a decorative-lighting wire is simply combining prior art elements according to known methods to yield predictable results" (Pet. 49 (citing *KSR*, 550 U.S. at 416; Ex. 1012 ¶ 97)). In particular, Petitioner contends Fujii teaches reinforced wire, which could be used as a decorative-lighting wire (*id.*). Petitioner thus asserts an ordinarily skilled artisan would have found it obvious "to modify Fujii to be used as a decorative lighting wire such as Lin because such a modification involves a simple substitution of one known element for another to obtain the predictable results of a more durable decorative lighting wire" (*id.* (citing *KSR*, 550 U.S. at 416; Ex. 1012 ¶ 98)). Petitioner additionally points to the UL 2002 Standards that "contemplate[] use of reinforced wiring in decorative lighting" thus, "instruct[ing]" or suggesting to an ordinarily skilled artisan, "form[ing] light string wires, such as those taught by Lin, to include a polymer reinforcing strands to meet durability requirements for seasonal products" (*id.* at 49–50 (citing Ex. 1001, 40 § 13.2.4 (Exception No. 4); Ex. 1012 ¶ 98)). Therefore, according to Petitioner, an ordinarily skilled artisan "would have looked to Fujii for teachings of the specific construction of such a reinforced wire" (*id.* at 50 (citing Ex. 1012 ¶ 98)).

Patent Owner argues Petitioner fails to "state a valid motivation" for combining the teachings of Lin and Fujii (PO Resp. 54). More specifically, Patent Owner argues Lin's depiction of different light strings with different light sources "are depicted in schematic form, and are therefore[,] silent regarding twisting" (*id.*). Patent Owner argues, however, an ordinarily skilled artisan would understand the "wires must be twisted together" (*id.*). Patent Owner first argues the drawings are schematic and not "an accurate physical depiction of the light string wire" because "Lin does not number the wire conductors in any drawing"; "the specification of Lin only mentions the term 'wire' once"; and Petitioner's expert allegedly agrees Lin discloses "a schematic diagram" (*id.* at 55). Indeed, Patent Owner's expert, Dr. Brown testifies "Lin shows several figures of different light strings with different light sources, but it *does not specify* whether the wires of its strings are twisted together or not" (Ex. 2001 ¶ 107 (emphasis added)). Dr. Brown further testifies an ordinarily skilled artisan "would understand that prior art light strings *typically* feature twisted wires" and thus, "would expect that FIG. 1 [of Lin] would show twisted wires" and illustrating with two parallel lines is "out of convenience" (*id.* ¶¶ 109, 134 (emphasis added)). In addition, Dr. Brown testifies "Lin appears to be providing a schematic view of the wires in its light string, and it would be reasonable for a POSITA to *assume* Lin has twisted pairs of conductors" (*id.* ¶ 134 (emphasis added)). Thus, Dr. Brown, in his testimony, does not state definitively that an ordinarily skilled artisan would understand Lin to teach only twisted wires.

In response, Petitioner's expert, Dr. Fantone, testifies:

> It's an illustration to make a point for the person who drafted it. It's not a wiring diagram, per se, like you would see in a production facility, except perhaps to provide an overall view of things. But it's not intended to be scale, it's not intended to be an exact representation of what was done. It's a scheme or a schematic for the relationship of those components. In this case it does indicate that its series wired sockets and plurality of bulbs.

(Ex. 2036, 66:2–10). We credit Dr. Fantone's testimony that Lin does not disclose a wiring diagram per se, and is not intended to be an exact representation of what was done, as it is consistent with Patent Owner's assertion that "Lin does not depict a physical wire configuration," and Dr. Brown's testimony that Lin is just a schematic illustration.

Patent Owner relies on the UL 2002 Standard, asserting "Lin describes that *aspects* of its invention are designed to 'comply with the safety specification of U.S. Underwriters Laboratories, Inc." (PO Resp. 56

(emphasis added) (citing Ex. 1003 ¶ 37)) to support its argument that an ordinarily skilled artisan "would understand that Lin is teaching twisted pairs of wires in its light strings" (*id.* at 55–56). Paragraph 37, however, the only paragraph in Lin to discuss the U.S. Underwriters Laboratories, Inc., states:

> FIGS. 14 and 15 illustrate an LED protecting unit of the *sixth preferred embodiment* of the lamp string according to this invention. In order to comply with the safety specification of U.S. Underwriters Laboratories Inc., which specifies all conductive components of electric apparatus should be totally shielded to avoid skin contact with a human body, the resistor 73 of the LED protecting unit is required to be enclosed by an insulative encapsulant 75 which can be made from plastic materials, such as PVC

(Ex. 1003 ¶ 37 (emphasis added)). Thus, although Lin discusses *one* embodiment (the sixth one) that complies with U.S. Underwriters Laboratories Inc.'s safety specification, Lin does not disclose that all its embodiments comply with UL standards nor does Lin specify to which UL standards the reference is referring.

Patent Owner's remaining arguments are based on the contention that because Lin would have complied with the UL 2002 Standards, and in particular, the specific wire requirements set forth in Section 13.2.4 of the UL 2002 Standards, and the contention that an ordinarily skilled artisan "would understand [the] wires of the lamp string of Lin must be twisted pairs of wires in order to comply with the UL Standards" (PO Resp. 57–58 (citing Ex. 2041 ¶ 87)).

For example, based on Patent Owner's contention that an ordinarily skilled artisan would understand Lin to be teaching twisted pairs of wires, Patent Owner argues "Lin's twisted-pair configuration is sufficiently strong by UL 2002 Standards, relied upon by Petitioner, such that there is no valid motivation to modify Lin with Fujii" (*id.* at 58). More specifically, Patent Owner argues that "[b]ecause the wires of the lighting string of Lin must be twisted wires, a [person of ordinary skill it the art] would have understood that the lighting string of Lin met the requirements of Sec. 13.2.4 of the UL 2002 Standards, without being modified to incorporate the wire of Fujii" (*id.*). Patent Owner's argument appears to be that an ordinarily skilled artisan would not seek to improve upon the technology set forth in Lin based on the UL 2002 Standards.

As previously discussed, however, Lin does not require adherence to UL 2002 Standards for the relied-upon disclosure. Moreover, we are not persuaded a person of ordinary skill in the art would have sought to adhere to already existing standards and not seek to improve on the technology disclosed in the art. Abiding by these standards is not required (Pet Reply 12 (citing Ex. 1014, 64:11–65:7). Additionally, adherence to these standards is not necessary to innovate —"if the UL was so strict as [Patent Owner] would have this panel believe, there would never be any innovation or any changes to products because there wouldn't be any way to get anything approved. And that's, of course, not the case" (IPR Tr. 11:4–7). Indeed, Dr. Brown testifies "the standards set a set of expectation for the properties for whatever is covers … That doesn't restrict innovation or evolution. That's the continual evolution of standards" (Ex. 1014, 66:2–13, 69:11–70:4).

Furthermore, Lin describes a drawback with lamp strings is damaging the structure due to incorrect and forced insertion of the lights (Ex. 1003 ¶¶ 7–8). Fujii describes a "strong requirement for reliability" and describes "a wire conductor which has high tensile strength and impact resistance as well as high conductivity" (Ex. 1004, 2:18–22). Thus, both references are directed to durability. Accordingly, based on the record before us, we are persuaded an ordinarily skilled artisan would have been motivated to combine the teachings of Lin's lamp string and Fujii's reinforced wire to obtain a more durable lighting product as asserted by Petitioner (Pet. 49–50).

We are also persuaded "employing the structure of Fujii as a decorative-lighting wire is simply combining prior art elements according to known methods to yield predictable results" (Pet. 49 (citing *KSR*, 550 U.S. at 416; Ex. 1012 ¶ 97)). Patent Owner contends "Petitioner never identified the predictable results, let alone the known methods" (PO Resp. 59). Patent Owner, however, does not dispute that Fujii's reinforced wire is known (*see generally* PO Resp.). Petitioner is using reinforced wire of Fujii for the wire of Lin (Pet. 49). Petitioner has set forth the reinforced wire yields a more durable lighting product (Pet. 49–50). We are persuaded that a more durable lighting product is the predictable result based on disclosure in Lin and Fujii (Ex. 1003 ¶¶ 7–8; Ex. 1004, 2:18–22).

Patent Owner additionally argues "Fujii's upper range of Fujii's conductor surface area (0.3 mm^2) is less than the area required based on the minimum wire gauge that UL standards specify and require" (PO Resp. 59–60). As discussed above, Patent Owner's argument is premised on bodily incorporating Fujii's reinforced wire into Lin's system.

> To justify combining reference teachings in support of a rejection it is not necessary that a device shown in one reference can be physically inserted into the device shown in the other. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

(*Keller*, 642 F.2d at 425 (citations omitted)).

Petitioner, however, is not relying on the exact dimensions of Fujii's wires; rather, Petitioner is relying on Fujii's teaching of reinforced wire and particularly "a wire conductor which has high tensile strength and impact resistance as well as high conductivity by composing the aramid fiber bundle or braid having extremely high tensile strength and impact resistance with the strands having high conductivity" (Pet. 47–48).

Patent Owner lastly contends "the results are not predictable because of potential crimping issues. Debladis[3] warns that wire like Fujii [sic] cause problems with crimping" (PO Resp. 60 (citing Ex. 1006, 2:3–12; Ex. 2041[4] ¶ 92)). Patent Owner does not further elaborate on this argument (*id.*). Debladis describes:

> Merely replacing the central copper strand in the structure of FIG. 1 with a multifilament polymer core of the kind described in U.S. Pat. No. 7,145,082 is not appropriate since such a cable does not provide sufficient guarantees concerning crimping operations. Once such a cable is stripped for a crimping operation, the copper strands splay apart from one another a little, and some of the polymer filaments making up the core run the risk of escaping radially between two copper strands

(Ex. 1006, 2:3–12). This disclosure does not discuss Fujii (*see id.*). Additionally, this disclosure discusses stripping a cable "for a crimping operation" and Patent Owner has not explained how that relates to replacing Lin's wire with Fujii's reinforced wire. Dr. Brown's testimony cited by

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[3] Debladis is not part of this ground, but we understand Patent Owner to be citing it here as evidence of the knowledge of one of ordinary skill in the art.
[4] We note Patent Owner cites Exhibit 2014 for support; however, Patent Owner has not submitted an Exhibit 2014 (*see* PO Resp. vi). Based on the context, we believe Patent Owner meant to cite to Exhibit 2041.

Patent Owner, provides no additional discussion (Ex. 2041 ¶ 92). Thus, we are unpersuaded the results are not predictable because of potential crimping issues.

Based on the record before us, we determine an ordinarily skilled artisan would have found it obvious to combine the teachings of Lin and Fuji. Patent Owner does not offer any additional arguments regarding secondary considerations of non-obviousness beyond those discussed above. Accordingly, based on the record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that the subject matter of claim 7 would have been obvious over the teachings of Lin and Fujii (and, optionally, the UL 2002 Standards).

4. Dependent Claims 8–10, 12, 14, 15, 17, and 18

Petitioner has set forth how the recited references teach or suggest the limitations as recited in claims 8–10, 12, 14, 15, 17, and 18 and why an ordinarily skilled artisan would have combined the teachings and suggestions of the references (Pet. 53–64). Patent Owner makes no additional arguments as to these claims other than the arguments addressed above as to claim 7 (PO Resp. 62). Based on our review of the record before us, we are persuaded that the combination of Lin and Fujii (and optionally UL 2002 Standards) teaches or suggests the limitations as recited in claims 8–10, 12, 14, 15, 17, and 18, and that Petitioner has demonstrated adequately that a person of ordinary skill in the art would have had reason to combine the teachings and suggestions of the references.

5. Conclusion

Based on the full record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that claims 7–10, 12, 14, 15, 17, and 18 are unpatentable as obvious over the teachings of Lin and Fujii (and, optionally, the UL 2002 Standards).

F. Asserted Obviousness over Lin and Huang: claims 7–8, 10–14, 19, and 20

1. Reference – Huang (Ex. 1005)

Huang is a patent application publication titled "Flat Cable, Cable Harness Using the Same and Method of Making the Flat Cable" (Ex. 1005, code (54)). Huang describes a wire that has "increase[d] resistance to tension which is applied in a longitudinal direction" to prevent "breakage of [the] wire caused by tension" (*id.* ¶¶ 42, 44). Figure 2 shows such a wire, and is reproduced below.

FIG.2

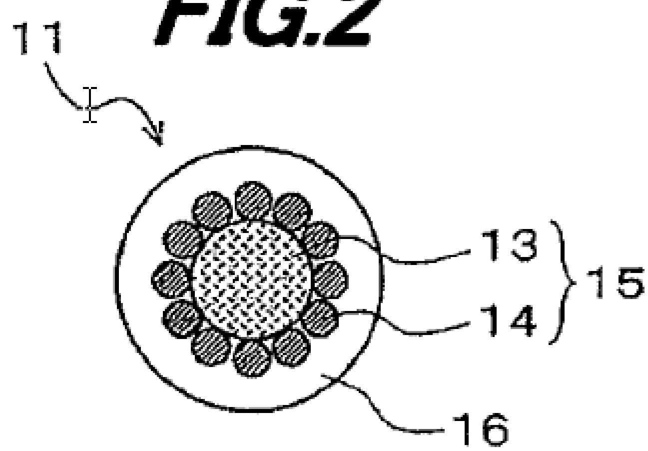

Figure 2 shows a cross sectional view
of a wire (Ex. 1005 ¶ 34).

As shown in Figure 2, "wire 11 has an inner conductor 15 composed of a filament 13 formed of a tensile fiber or a fiber having stretching properties, etc., and plural conductors 14 spirally wound around an outer periphery of the filament 13" (*id.* ¶ 39). The "tensile fiber used for the filament 13 includes, e.g., a polyamide fiber such as aramid and a polyester fiber such as polyethylene terephthalate (PET), etc." (*id.* ¶ 40). Further, "plural conductors 14, which are spirally wound, lengthwise disposed or braided on an outer periphery of the filament 13," can be made of copper wire (*id.* ¶ 44).

2. Alleged Non-Analogous Art

Petitioner states "both Lin and Huang are analogous art to the '588 patent [because the] references both disclose a conductive wire for products that require electricity, and are in the same field of endeavor" (Pet. 61).

Patent Owner contends "Huang is from a different field of endeavor" than the '588 Patent and specifically, "Huang does not relate to decorative lighting" but rather, "is directed to a cable . . . placed inside a body-worn device or a cloth attachment type device" (PO Resp. 65 (citing Ex. 1005, ¶¶ 1–31)). Patent Owner asserts Huang teaches "[t]he wire must have specific tensile strength to prevent breakage of wire when being worn by a person" (*id.* at 65–66 (citing Ex. 1005 ¶¶ 43–44; Ex. 2041, ¶ 100)). According to Patent Owner, an ordinarily skilled artisan "working on decorative lighting would not be expected to know the particularities and science of body-worn devices" (PO Resp. 66 (Ex. 2041 ¶ 101)).

Again, as discussed *supra,* we consider the scope of analogous prior art in light of the test set forth in *Bigio*, 381 F.3d 1320. As previously discussed, Patent Owner seemingly focuses only on the end-use of the subject matter described in the '588 Patent, namely decorative lighting. The "explanations of the invention's subject matter" in the '588 Patent, however, extends beyond "decorative lighting."

In particular, the title, Abstract, and Field of Invention in the '588 Patent each refer to reinforced wiring (Ex. 1001, code (54), Abstract, 1:1–2, 13–17). The '588 Patent states that "[w]ires used in decorative lighting typically include an electrical conductor surrounded by an insulating material. The electrical conductor usually comprises multiple, individual strands of copper conductors" (Ex. 1001, 1:26–30). Additionally, the '588 Patent contains several figures depicting the structure of its wires, and describes several embodiments of its reinforced wires (*see e.g.*, Ex. 1001, 2:34–59, Figs. 3, 4A–4C, 6, 4:56–9:67). Although the '588 Patent is directed to the use of this reinforced wiring in decorative lighting, it is clear that at least some of the "the embodiments, function, and structure of the claimed invention" focuses on the wiring itself.

Consistent with the holding in *Bigio*, Petitioner's characterization of the field of endeavor is not limited by, or based on, the end-use of the wire. The wires/cables of Huang and the '588 Patent both share common fundamental features associated with electric wiring, namely an electrical conductor, often comprised of multiple, individual strands of copper, surrounded by an insulating material (*see* Ex. 1001, 1:26–30; Ex. 1005 ¶¶ 39, 44 (describing "[a] material of the conductor 14 used for the inner conductor includes a copper wire and an aluminum wire, etc.")). Furthermore, despite Patent Owner's characterization of Huang as being "directed to a cable . . . placed inside a body-worn device or a cloth attachment type device" (PO Resp. 65 (citing Ex. 1005 ¶¶ 1–31)), we note that Huang titles its invention as "Flat Cable, Cable Harness Using the Same and Method of Making the Flat Cable" (Ex. 1005, code (54)). Huang further does not limit its invention to a body-worn device in the Abstract or the claims (*id.* at Claims). Accordingly, we determine that Huang and the ’588 Patent are from the same field of endeavor.

Again, as previously discussed, declarants from both parties agree that decorative lighting and electrical wiring are inexorably intertwined, which undermines Patent Owner’s arguments that Huang, a reference addressing electrical wiring, is from a different field of endeavor than the ’588 Patent (Ex. 1015, 11:15–12:22; Ex. 1014, 25:16–18, 28:5–8; Ex. 1018 ¶ 15).

For all of the foregoing reasons, we determine that Lin[5] and Huang are analogous art and qualify as prior art for an obviousness determination.

3. Analysis of Claim 7

a) Limitations

Petitioner contends Lin and Huang (and optionally UL Standards) teach a “reinforced decorative light string” (Pet. 59–60 (citing Ex. 1003 ¶ 5)). Petitioner also contends Lin teaches, as recited in claim 7, “a plurality of lamp assemblies, each of the plurality of lamp assemblies including a lamp element having a first lead and a second lead”; “a first power wire electrically connected to at least one of the plurality of lamp assemblies”; and “a second power wire electrically connected to at least one of the plurality of lamp assemblies” (Pet. 60 (citing Pet. Sections VII(C)(i)(b)–(d)). Petitioner further contends Lin and Huang (and optionally UL 2002 Standards) teach “a plurality of reinforced light-connecting wires, each reinforced light-connecting wire electrically connected to at least two of the

[5] Patent Owner does not dispute that Lin and the ’588 Patent are from the same field of endeavor.

plurality of lamp assemblies," as recited in claim 7 (*id.* at 60–63 (citing Ex. 1005 ¶ 42, Fig. 2; Ex. 1011, 40)).

Lastly, Petitioner contends Huang teaches, as recited in claim 7, "each of the plurality of light-connecting wires including: an axially-extending reinforcing strand including a polymer material" (*id.* at 63–64 (citing Ex. 1005 ¶¶ 39–41, Fig. 2)); "a conductor layer including a plurality of axially-extending conductors adjacent the reinforcing strand, each of the plurality of axially-extending conductors comprising a copper material" (*id.* at 64 (citing Ex. 1005 ¶¶ 39, 44, Fig. 2)); and "an outer insulating layer enveloping the conductor layer and the reinforcing strand" (*id.* at 65 (citing Ex. 1005 ¶ 39, Fig. 2)).

Patent Owner makes no specific arguments directed to these limitations (*see generally* PO Resp.).

Based on the record before us, we determine Petitioner has shown the combination of Lin and Huang teaches or suggests the limitations recited in claim 7.

b) Rationale to Combine

Petitioner argues "[t]o the extent that Lin does not expressly disclose that these light-connecting wires are reinforced, Huang does" (Pet. 61). Petitioner then asserts an ordinarily skilled artisan would have found it obvious to modify "the light connecting wires of Lin to include a reinforced wire as taught by Huang" (*id.*). Petitioner sets forth "employing the structure of Huang as a decorative-lighting wire is simply combining prior art elements according to known methods to yield predictable results" (Pet. 62 (citing *KSR,* 550 U.S. at 416; Ex. 1012 ¶ 132)). Petitioner further asserts "using the reinforced wire disclosed by Huang as a decorative-lighting wire is simply using a known technique to improve the similar device disclosed by Lin (*id.* (citing *KSR,* 550 U.S. at 417; Ex. 1012 ¶ 132)). Citing specific portions of Huang, Petitioner notes that Huang teaches wires "having a reinforcing filament 13 that makes it 'possible to increase resistance to tension' or 'is effective to improve a capability of following movement of a wiring portion'" (*id.* at 61 (quoting Ex. 1005 ¶ 42). Petitioner contends an ordinarily skilled artisan would have found it obvious "to modify Huang to be used as a decorative lighting wire such as Lin because it involves a simple substitution of one known element for another to obtain the predictable results of a more break resistant decorative lighting wire" (*id.* (citing *KSR,* 550 U.S. at 416; Ex. 1012 ¶ 133)). Petitioner also optionally relies on UL 2002 Standards to show that "decorative lighting products as far back as 2002 have contemplated the use of reinforced wiring in decorative lighting" (*id.* at 62).

Patent Owner argues that the UL 2002 Standards do not reference internally reinforced wires and, thus, "in light of references like Fujii which issued in 1993, the absence of reference to reinforced wire in the UL Standards [from 2002] is evidence that reinforced wires are not obvious in the art of decorative lighting" (PO Resp. 62–63). Thus, Patent Owner argues "employing the wire of Huang would not be [a] combination of prior art elements to known methods to yield predictable results and the Petition does not state a valid motivation for [the] combination of Lin and Huang (PO Resp. 63).

Patent Owner also relies on the same arguments presented above with regard to Lin, again arguing an ordinarily skilled artisan would "assume Lin has twisted pairs of conductors" (PO Resp. 63). Thus, Patent Owner contends, "assuming Lin is twisted, it is stronger than an isolated wire" or a single wire (*id.*). Moreover, Patent Owner contends "assuming Lin is not twisted, then the 18AWG wire required by the UL [2002] Standards is much thicker than a 22AWG wire" and accordingly, an ordinarily skilled artisan "would appreciate that neither case calls for extra reinforcement" and would not have been motivated to include the wire of Huang in Lin (*id.* at 64).

As set forth above, we disagree that Lin is necessarily teaching twisted wires. Moreover, Patent Owner appears to be arguing that because the element of the recited claim is not taught by the UL 2002 Standards specifically, an ordinarily skilled artisan would not have been motivated to combine the teachings of Lin and Huang. We disagree that "the absence of reference to reinforced wire in the UL [2002] Standards is evidence that reinforced wires are not obvious in the art of decorative lighting" as asserted by Patent Owner (*see* PO Resp. 63). That a standard does not describe a specific arrangement does not by itself indicate a person of ordinary skill in the art would not have had a reason to seek improvements in existing wires disclosed in the art (*see* IPR Tr. 11:4–7; Ex. 1014, 66:2–13, 69:11–70:4)).

Similarly, Patent Owner's argument that even if Lin is not twisted, "the 18 AWG wire required by the UL [2002] Standards is much thicker than a 22 AWG wire," seems to rely on a person of ordinary skill in the art adhering to the UL 2002 Standards and the argument that an ordinarily skilled artisan would not have modified Lin because the UL 2002 Standards did not teach the modification.

A skilled artisan would "be able to fit the teachings of multiple patents together like pieces of a puzzle" since the skilled artisan is "a person of ordinary creativity, not an automaton" (*KSR*, 550 U.S. at 420-21). Here, we are persuaded by Petitioner's assertion that an ordinarily skilled artisan would have modified Lin to include Huang. Petitioner directs us to specific evidence in Huang relating to "increased resistance to tension" and "improv[ing] a capability of following movement of a wiring portion." (Pet. 61 (citing Ex. 1005 ¶ 42)). There is no evidence that replacing Lin's wire with a reinforced wire would have been "uniquely challenging or difficult for one of ordinary skill in the art" or "represented an unobvious step over the prior art" (*Leapfrog*, 485 F.3d at 1162 (citing *KSR*, 550 U.S. at 418-19)). To the contrary, Dr. Fantone testifies "it would have been easy for a POSITA to connect Huang's conductors 14 to the first and second conductive contacts 651, 652 of Lin's bulb mounting units" (Ex. 1012 ¶ 132). Patent Owner did not dispute this specific testimony.

Accordingly, based on the record developed at trial, we are persuaded Petitioner has articulated reasoning with a rational underpinning as to why an ordinarily skilled artisan would have combined the teachings of Lin and Huang. .

c) Conclusion

Based on the full record developed during trial,[6] Petitioner has shown by a preponderance of the evidence that the teachings of Lin and Huang render claim 7 obvious.

4. Dependent Claims 8, 10–14, 19, and 20

Petitioner has set forth how the recited references teach or suggest the limitations as recited in claims 8, 10–14, 19, and 20 and why an ordinarily skilled artisan would have found it obvious to combine the teachings and suggestions of the references (Pet. 66–75). Patent Owner makes no specific

[6] Patent Owner does not offer any additional arguments regarding secondary considerations of non-obviousness for this challenge beyond those discussed above.

arguments regarding these claims (*see* PO Resp. 68). Based on the record developed during trial, we are persuaded the combination of Lin and Huang (and optionally UL Standards) renders obvious the limitations as recited in claims 8, 10–14, 19, and 20.

5. *Conclusion*

Based on the record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that claims 7, 8, 10–14, 19, and 20 would have been obvious over the teachings of Lin and Huang (and, optionally, the UL 2002 Standards).

G. *Asserted Obviousness over Lin, Huang, and Debladis (and optionally UL 2002 Standards): claim 9*

Petitioner contends the combination of Lin, Huang, and Debladis (and optionally UL Standards) renders claim 9 obvious (Pet. 75–77).

1. *Reference – Debladis (Ex. 1006)*

Debladis is a patent titled "Electrical Control Cable" (Ex. 1006, code (54)). Debladis teaches an electronic control cable that comprises "a plurality of strands 20 of conductive material, e.g. copper, extending in the longitudinal direction of a central core 40 of multifilament polymer" (*id.* at

3:15–18). Further, Debladis describes central core can be embodied as a "unitary structure 40," as shown in Figure 4, reproduced below.

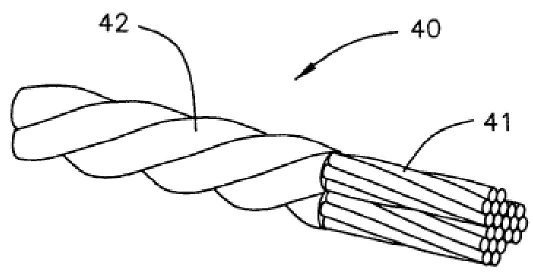

FIG. 4

Figure 4 shows a non-metallic unitary structure of a core (Ex. 1006, 3:6–7).

As shown in Figure 4, the "core filaments are organized as a plurality of subassemblies," and "[e]ach subassembly is made up of a plurality of filaments 41" (*id.* at 3:45–51).

2. Analysis

Petitioner has set forth where the combination of references teaches or suggests the limitation recited in claim 9 and why an ordinarily skilled artisan would have been motivated to combine the prior art (Pet. 76–77). Patent Owner does not specifically address this ground, relying instead on the arguments set forth for claim 7 (PO Resp. 68). Based on the record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that claim 9 would have been obvious over the teachings of Lin, Huang, and Debladis.

H. Asserted Obviousness over Lin, Huang, and Pacini (and optionally UL 2002 Standards): claim 11

Petitioner contends the combination of Lin, Huang, and Pacini (and optionally UL Standards) renders claim 11 obvious (Pet. 78–79).

1. Pacini (Ex. 1010)

Pacini is a patent titled "Christmas Tree Lighting Systems" (Ex. 1010). Pacini's Christmas tree lighting system fastens an electricity "distribution means 10" onto "one side of the trunk of the tree to be lighted" (*id.* at 3:49–55; *see id.* at Fig. 1). Distribution means 10 is formed from distribution members 12 and 14; those distribution members are able to "receive the conducting prongs or terminals of an ordinary household plug or connector" (*id.* at 2:23–26, 3:6–8; *see id.* at Fig. 2). As such, lights for the tree can be plugged into the distribution members (*id.* at 4:24–28). Further, distribution means 10 includes a "usual male type electrical plug 45 to be inserted into a household electrical outlet" which "energizes" the distribution means and distribution members 12 and 14 (*id.* at 3:73–4:2). Accordingly, the lights plugged into the distribution members are lit (*id.* at 4:32–35).

2. Conclusion

Petitioner has set forth where the combination of references teaches or suggests the limitations recited in claim 11 and why an ordinarily skilled artisan would have been motivated to combine the prior art (Pet. 78–79). Patent Owner does not specifically address this ground, relying instead on the arguments set forth for claim 7 (PO Resp. 68). Based on the record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that claim 11 would have been obvious over the teachings of Lin, Huang, and Pacini.

I. Asserted Obviousness over Lin, Huang, and Wlos (and optionally UL 2002 Standards): claim 16

Petitioner contends the combination of Lin, Huang, and Wlos (and optionally UL Standards) renders claim 16 obvious (Pet. 77–78).

1. Reference – Wlos (Ex. 1007)

Wlos is a patent application publication titled "Small-Gauge Signal Cable and its Method of Use" (Ex. 1007, code (54)). Wlos describes a signal cable having "improved flexibility and break strength" (*id.* ¶ 4). Figure 1 of Wlos illustrates such a signal cable and is reproduced below.

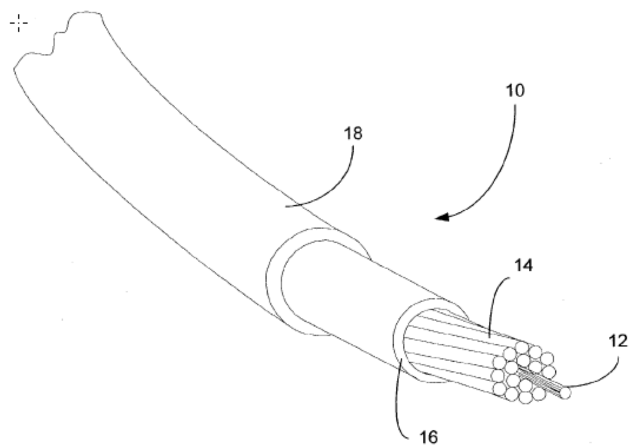

FIG. 1

Figure 1 is a perspective view of
a signal cable (Ex. 1007 ¶ 5).

As shown in Figure 1, "signal cable 10 has a fiber core 12 and a plurality of conductor wires 14 surrounding the fiber core in a generally concentric fashion" (*id.* ¶ 7). Further, "the conductor wires 14 are inside a layer of conductive polymer coating 16" (*id.* ¶ 10).

2. Conclusion

Petitioner has set forth where the combination of references teaches or suggests the limitations recited in claim 16 and why an ordinarily skilled artisan would have been motivated to combine the prior art (Pet. 77–78). Patent Owner does not specifically address this ground, relying instead on the arguments set forth for claim 7 (PO Resp. 68). Based on the record developed during trial, we conclude Petitioner has established by a preponderance of the evidence that claim 16 would have been obvious over the teachings of Lin, Huang, and Wlos.

III. MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude Evidence (Paper 32 ("Mot. to Ex.")). In response, Petitioner filed an Opposition to Patent Owner's Motion to Exclude (Paper 33 ("Pet. Opp.") and Patent Owner then filed Patent Owner's Reply in Support of its Motion to Exclude (Paper 37 ("PO Reply to Opp.")).

In its Motion to Exclude, Patent Owner moves to exclude numerous exhibits including Exhibits 1004–1010; Appendices B–H and I–L of Exhibit 1012; Exhibits 1013, 1023, and 1025–1027; various paragraphs of Exhibits 1018–1020; and various paragraphs of Paper 22.

For the reasons provided below, we deny-in-part and dismiss-in-part Patent Owner's Motion to Exclude.

Patent Owner moves to exclude:

> Exhibit 1012, Declaration of Dr. Fantone, Appendices I–L and references to them because "they are not authenticated, are not an original or an admissible duplicate, and constitute inadmissible hearsay" (Mot. to Ex. 1 (citing FRE 802, 901, 1002));
>
> Exhibit 1012, Declaration of Dr. Fantone, Appendices B–H and

references to them because "[t]hese cites and their respective appendices amount to an imprecise and prejudicial reference to a volume of information that amounts to a 'pointless imposition' on the Board's time" (*id.* at 3 (citing 77 Fed. Reg. 48,612, 48, 617 (Aug. 14, 2012)); and "as an attempt to circumvent the type volume limits that apply to petitions" (*id.* (citing *Fidelity Nat'l Info. Servs. Inc. v. DataTreasury Corp.*, IPR2014-00491, Paper 9 at 8 (Aug. 13, 2014)));

Exhibit 1013, 2001 UL 62 Standards because "Petitioner filed Exhibit 1013 for the first time with its Reply," without justification and thus, is prejudicial to Patent Owner (*id.* at 6);

Exhibit 1026, "2004 UL 588 Standards" for the same reasons set forth for Exhibit 1013 (*id.* at 8).

Exhibit 1027 because it is "not cited or discussed in any document and thus is not relevant" (*id.* at 9).

Exhibit 1018, Supplemental Declaration of Dr. Fantone, paragraphs 19, 21–23, 34, and 35 because these paragraphs "relate to new argument and evidence that was not timely presented and should be excluded" (*id.* at 9).

Exhibit 1019, Declaration of Mr. Bruce Proper, paragraphs 14, 19–21, 24–32, and 36 because these paragraphs "are new argument and evidence that is inconsistent with prior testimony" (*id.* at 11).

Exhibit 1020, Declaration of Mr. Wai Lung ("Patrick") Wong, paragraphs 15, 19–28, 30–37, and 40–44 because these paragraphs "discuss intent and should be given no weight" (*id.* at 12).

Exhibit 1023, Patent for Invention with Mr. Zhongwei Chen as an inventor because this reference "was not previously of record and was not argued and does not establish insufficiency of wires for their intended purpose" and "was belatedly raised in the Reply" (*id.* at 13).

Exhibit 1025, UL FAQs because this document is "not prior art and [ ] not cited in any document" (*id.* at 13–14).

Paper 22, Reply, paragraphs referencing the paragraphs of Exhibits 1018, 1019, and 1020 listed above as well as "the other identified documents" because of reasons identified in Paper 27 (*id.* at 14).

We dismiss Patent Owner's motion to exclude the above as moot. The portions of the exhibits and the exhibits listed do not form any basis for reaching our decision in this proceeding.

Patent Owner further moves to exclude Exhibits 1004–1007, 1009, and 1010 because "[t]he Petition and Reply fail to establish these references are analogous subject matter" and "[t]hese exhibits are irrelevant or, at the very least have probative value that is substantially outweighed by a danger of unfair prejudice based on hindsight application of them, resulting in confusion of the issues of this proceeding and waste of time" (Mot. to Ex. 4 (citing 37 C.F.R. § 42.61, FRE 401–403)).

Patent Owner argues Patent Owner's Motion is procedurally deficient (Pet. Opp. 2–3). Our rules instruct that a motion to exclude evidence should:

(a) Identify where in the record the objection originally was made;

(b) Identify where in the record the evidence sought to be excluded was relied upon by an opponent;

(c) Address objections to exhibits in numerical order; and

(d) Explain the basis and grounds for each objection.

(37 C.F.R. §§ 42.64(c); Patent Trial and Appeal Board Consolidated Trial Practice Guide 79 (November 2019)). Here, for certain exhibits, Patent Owner fails to identify where Petitioner relies on the evidence to be excluded and does not explain sufficiently the substance of its objections for each piece of evidence Patent Owner argues should be excluded (*see id.*). Accordingly, Patent Owner's Motion to Exclude is procedurally deficient.

Furthermore, Patent Owner's motions go to the weight and sufficiency of the evidence, rather than its admissibility. More specifically, we find the exhibits relevant and are not persuaded that they should be excluded under Federal Rule of Evidence 403. The party moving to exclude evidence bears the burden of proving that it is entitled to the relief requested—namely, that the material sought to be excluded is inadmissible under the Federal Rules of Evidence ("FRE") (*see* 37 C.F.R. §§ 42.20(c), 42.62(a) (2019)). Here, Federal Rule of Evidence 403 provides that relevant evidence may be excluded "if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence."

Patent Owner does not explain sufficiently in its Motion why any of these factors substantially outweighs the probative value of Exhibits 1004–1007, 1009, and 1010. Rather, Patent Owner sets forth a general statement without providing specifics (Mot. to Ex. 4).

Petitioner has set forth the references teach or suggest elements of the disputed claims (*see* Pet.). The evidence Patent Owner seeks to exclude supports Petitioner's argument of obviousness and, specifically, the exhibits relate to evidence of obviousness. The references are relevant and specifically, the references have (a) "a tendency to make a fact more or less probable than it would be without the evidence; and (b) the [references] are of consequence in determining this [proceeding]" (FRE 401). In addition, in an *inter partes* review in which we both decide admissibility and serve as the fact-finder, we are well positioned to determine and assign appropriate weight to evidence presented, and we recognize that a complete record of the evidence is preferable to facilitate public access as well as appellate review (*see, e.g., Sony Computer Entm't Am. LLC v. Game Controller Tech. LLC*, IPR2013-00634, Paper 32 at 31 (PTAB Apr. 14, 2015); *see also Gnosis S.p.A. v. S. Alabama Med. Sci. Found.*, IPR2013-00118, Paper 64 at 43 (PTAB June 20, 2014) (citing *Donnelly Garment Co. v. NLRB*, 123 F.2d

215, 224 (8th Cir. 1941)). Further, the decision here is rendered by the panel, not a jury; therefore, there is little risk of unfair prejudice, confusing the issues, or wasting time. Accordingly, we determine the Exhibits are relevant and its probative value is not substantially outweighed by any of Patent Owner's articulated factors and particularly, not outweighed by a danger of "unfair prejudice, confusing the issues, . . . [or] wasting time" (*see* FRE 403).

Patent Owner also moves to exclude Exhibits 1004–1010 "based on irrelevance because the Reply alleges that '[t]he 2015 UL 588 Standard [Ex. 2048] better reflects the state of the art in the 2013 time frame than the 2002 UL Standard [Ex. 1011]" (Mot. to Ex. 4 (citing Reply 14; Ex. 1019 ¶¶ 22–25)). According to Patent Owner, "the grounds of this proceeding are all based on old documents and do not reflect what a POSITA in 2013 would consider if Petitioner's Reply and alleged evidence are considered *arguendo*" (*id.*). Again, Patent Owner is arguing the weight and content of the evidence and has not shown the probative value is outweighed by the dangers argued. We are, therefore, not persuaded the Exhibits are irrelevant and should be excluded (*see* FRE 402, 403).

Accordingly, Patent Owner's motion to exclude Exhibits 1004–1010 is *denied*.

IV. JOINT MOTION TO SEAL

The parties filed a Joint Motion to Seal selected portions of Exhibit 1024, which is the deposition transcript of Michael Sugar in PGR2019-00056 (Paper 38). The parties submitted a version of the transcript with redactions (Ex. 1016) and a proposed protective order reflecting the provisions set forth in the Board's default protective order (Ex. 1028). The parties indicate that good cause exists for sealing the redacted information because it concerns "non-public sensitive technical and financial information including sales and profit information, communications, and other highly sensitive nonpublic information" that "could result in harm and business losses if released to the public" (Paper 38, 2).

The standard for granting a motion to seal is good cause (37 C.F.R. § 42.54). That standard includes showing that the information addressed in the motion to seal is truly confidential, and that such confidentiality outweighs the strong public interest in having the record open to the public (*see Garmin Int'l v. Cuozzo Speed Techs., LLC*, IPR2012-00001, Paper 34 at 2–3 (PTAB Mar. 14, 2013)).

After considering the redacted portions of the deposition transcript and the corresponding explanation of the confidential nature of the information, we determine that sufficient good cause is established for sealing the portions of Exhibit 1024 identified in the Joint Motion to Seal. Accordingly, we grant the Joint Motion to Seal Exhibit 1024 and the associated request to enter the protective order submitted as Exhibit 1028.

V. CONCLUSION[7]

For the foregoing reasons, in view of the record that developed during trial, we conclude that Petitioner has shown by a preponderance of the evidence that claims 1–20 are unpatentable.

[7] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–3, 6	103	Harris, Fujii, (optionally UL 2002 Standards)	1–3, 6	
4, 5	103	Harris, Fujii, (optionally UL 2002 Standards), Bowden	4, 5	
7–10, 12, 14, 15, 17, 18	103	Lin, Fujii, (optionally UL 2002 Standards)	7–10, 12, 14, 15, 17, 18	
7, 8, 10–14, 19, 20	103	Lin, Huang, (optionally UL 2002 Standards)	7, 8, 10–14, 19, 20	
9	103	Lin, Huang, (optionally UL 2002 Standards), Debladis	9	
11	103	Lin, Huang, (optionally UL 2002 Standards), Pacini	11	
16	103	Lin, Huang, (optionally UL 2002 Standards), Wlos	16	
Overall Outcome			1–20	

VI. ORDER

For the reasons given, it is:

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or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

ORDERED that Petitioner has shown, by a preponderance of the evidence, that claims 1–20 of the '588 patent are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude Appendices B–H and I–L of Exhibit 1012; Exhibits 1013, 1023, and 1025–1027; various paragraphs of Exhibits 1018–1020; and various paragraphs of Paper 22 is *dismissed* as moot;

FURTHER ORDERED that Patent Owner's Motion to Exclude Exhibits 1004–1007, 1009, and 1010 is *denied*;

FURTHER ORDERED that the parties' Joint Motion to Seal is *granted*; and

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

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