

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TOSHIBA AMERICA INFORMATION SYSTEMS, INC.

and

MSI COMPUTER CORP.,

Petitioner,

v.

WALLETEX MICROELECTRONICS LTD.,

Patent Owner.

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IPR2018-01538

Patent 7,458,825 B2

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Before MICHAEL R. ZECHER, THOMAS L. GIANNETTI, and  
SCOTT B. HOWARD, *Administrative Patent Judges*.

HOWARD, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining All Challenged Claims Unpatentable

Denying Patent Owner's Motion to Amend

35 U.S.C. § 318(a)

## INTRODUCTION

### *A. Background and Summary*

Toshiba America Information Systems, Inc. and MSI Computer Corp. (collectively “Petitioner”) filed a Petition requesting *inter partes* review of claims 1–24 of U.S. Patent No. 7,458,825 B2 (Ex. 1001, “the ’825 patent”) pursuant to 35 U.S.C. § 311. Paper 1 (“Pet.”). Walletex Microelectronics Ltd. (“Patent Owner”) filed a Patent Owner Preliminary Response. Paper 9. We instituted an *inter partes* review of claims 1–24 on all grounds of unpatentability alleged in the Petition. Paper 11 (“Institution Decision” or “Inst. Dec.”).

After institution of trial, Patent Owner filed a Response (Paper 19, “PO Resp.”), Petitioner filed a Reply (Paper 22, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 25, “PO Sur-reply”). In addition, Patent Owner also filed a Contingent Motion to Amend (Paper 18, “Motion to Amend” or “Mot. Amend.”), Petitioner filed an Opposition to Patent Owner’s Contingent Motion to Amend (Paper 23, “Opp. Amend”), Patent Owner filed a Reply to Petitioner’s Opposition (Paper 24, “Reply Amend”), and Petitioner filed a Sur-reply to Patent Owner’s Reply (Paper 28, “Sur-reply Amend”).

Petitioner relied on the testimony of R. Jacob Baker, Ph.D., P.E., (Exs. 1002, 1035) and Patent Owner relied on the testimony of Dr. Kenneth Fernald (Exs. 2004, 2007).

An oral hearing was held on December 3, 2019, and the record contains a transcript of this hearing. Paper 32 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that

follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–24 of the ’825 patent are unpatentable. We deny Patent Owner’s Motion to Amend to replace claims 1–24 with proposed substitute claims 25–48.

*B. Related Matters*

The parties identify the following related matters:

|    |                                                              |                   |           |
|----|--------------------------------------------------------------|-------------------|-----------|
| 1. | <i>Reversible Connections LLC<sup>1</sup> v. G.B.T. Inc.</i> | 2:17-CV-05382-JVS | C.D. Cal. |
| 2. | <i>Reversible Connections LLC v. AsRock Am., Inc.</i>        | 5:17-CV-01445-JVS | C.D. Cal. |
| 3. | <i>Reversible Connections LLC v. MSI Comput. Corp.</i>       | 2:17-CV-05383-JVS | C.D. Cal. |
| 4. | <i>Reversible Connections LLC v. Razer USA, Ltd.</i>         | 8:17-CV-01254-JVS | C.D. Cal. |
| 5. | <i>Reversible Connections LLC. v. Toshiba Am. Info. Sys.</i> | 8:17-CV-01252-JVS | C.D. Cal. |
| 6. | <i>G.B.T. Inc. v. Wallelex Microelectronics Ltd.</i>         | IPR2018-00325     | PTAB      |
| 7. | <i>G.B.T. Inc. v. Wallelex Microelectronics Ltd.</i>         | IPR2018-00326     | PTAB      |

Pet. 2–3, Paper 5, 1–2.

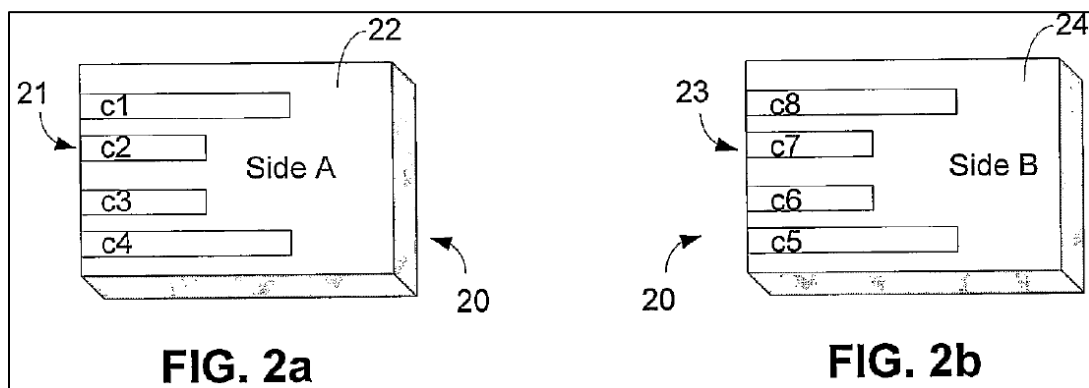
*C. The ’825 Patent*

The ’825 patent issued from U.S. Patent Application No. 11/629,870 (“the ’870 application”), which is a national stage filing of PCT application PCT/IL2005/000647. Ex. 1001, codes (21), (86). The ’825 patent also claims the benefit of U.S. Provisional Patent Application Nos. 60/675,450, 60/628,692, 60/614,393, and 60/580,573. *Id.* at code (60).

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<sup>1</sup> Patent Owner states it “conveyed all substantial rights in the [’]825 Patent to Reversible Connections LLC via an exclusive license agreement.” Paper 5, 1.

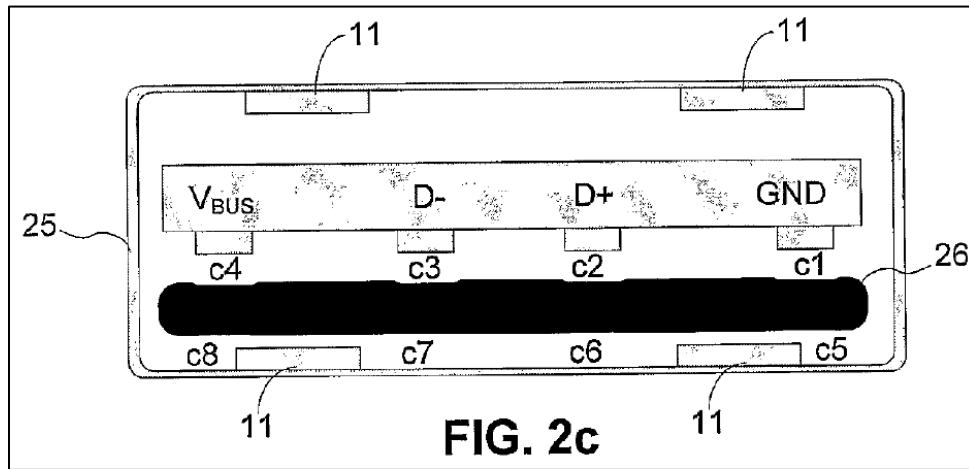
The '825 patent relates to connectors for connecting electrical devices. *E.g.*, Ex. 1001, code (57), 1:8, 2:65–3:3, 3:11–13. More specifically, the '825 patent discloses male connectors that can be inserted in either direction (i.e., in opposite orientations) into compatible female connectors while obtaining identical functionality regardless of the male connector's orientation. *E.g.*, *id.* at code (54) ("Double-Sided USB-Compatible Plug Connector Adapted for Insertion in Either Orientation Into a USB-Compatible Receptacle"), 3:22–29, 5:63–6:7. Figures 2a and 2b, reproduced below, illustrate an embodiment of these male connectors. *Id.* at 4:34–36.



Figures 2a and 2b illustrate a double-sided Universal Serial Bus ("USB") male connector having a set of electrical contacts on each side of the connector (i.e., a first set of contacts (c1–c4) on *Side A* (see Fig. 2a) and a second set of contacts (c5–c8) on the opposite side, *Side B* (see Fig. 2b)). *Id.* at 5:42–51, Figs. 2a, 2b. The sets of contacts are situated on the male connector so that one contact in each pair of complementary contacts (i.e., c1 or c8, c2 or c7, c3 or c6, and c4 or c5) mates with its corresponding contact in the compatible female connector. *Id.* at 5:52–6:7, 6:23–36. The pairs of complementary contacts also are interconnected (i.e., c1 to c8, c2 to c7, c3 to c6, and c4 to c5) as part of providing identical functionality

regardless of the male connector's orientation. *E.g., id.* at 5:52–6:7, 6:23–36, 6:58–61, Fig. 2d.

Figure 2c, reproduced below, illustrates a female connector in accordance with the '825 patent's disclosure. *E.g., Ex. 1001*, 5:52–62, 6:17–36, Fig. 2c.



More specifically, Figure 2c illustrates USB female connector 25 having slot 26 into which double-sided USB male connector 20 can be inserted. *Id.* at 5:52–62, 6:17–36. Female connector 25 has a single set of contacts (i.e., V<sub>BUS</sub>, D<sup>-</sup>, D<sup>+</sup>, and GND (i.e., ground)). *Id.* at 5:52–62, 6:17–36, Fig. 2c. When male connector 20 is inserted with *Side A* face up, *Side A*'s contacts connect with female connector 25's single set of contacts (i.e., c4 to V<sub>BUS</sub>, c3 to D<sup>-</sup>, c2 to D<sup>+</sup>, and c1 to GND). *Id.* Alternatively, when male connector 20 is inserted with *Side B* face up, *Side B*'s contacts connect with female connector 25's single set of contacts (i.e., c5 to V<sub>BUS</sub>, c6 to D<sup>-</sup>, c7 to D<sup>+</sup>, and c8 to GND). *Id.* Male connector 20's contacts that are facing away from female connector 25's single set of contacts are referred to as “inactive” contacts. *E.g., Ex. 1004* (Response to Office Action), 10.

Figure 2c also illustrates female connector 25's resilient leaves 11 that press against male connector 20's outer surface, “thereby maintaining the

two connectors tightly coupled.” Ex. 1001, 2:5–8. Leaves 11 usually are metallic and are grounded via female connector 25’s rectangular frame. *Id.* at 6:36–39. Because (i) leaves 11 are grounded and (ii) male connector 20’s  $V_{BUS}$  contacts (i.e., c4 and c5) are interconnected, a short circuit can occur when male connector 20 is inserted into female connector 25. *Id.* at 6:36–40. More specifically, a short circuit can occur if male connector 20’s inactive  $V_{BUS}$  contact touches a leaf. *Id.* at Fig. 2d, 6:36–67 (describing that the active  $V_{BUS}$  contact is connected to the inactive  $V_{BUS}$  contact, which can touch a leaf that is connected to ground).

To address this short circuit problem, the ’825 patent discloses using devices such as diodes or relay units to prevent the short circuit. Ex. 1001, 6:41–7:7, Figs. 2d, 2e. Figure 2d, reproduced below, shows diodes employed to prevent the short circuit. *Id.* at 6:41–67, Fig. 2d.

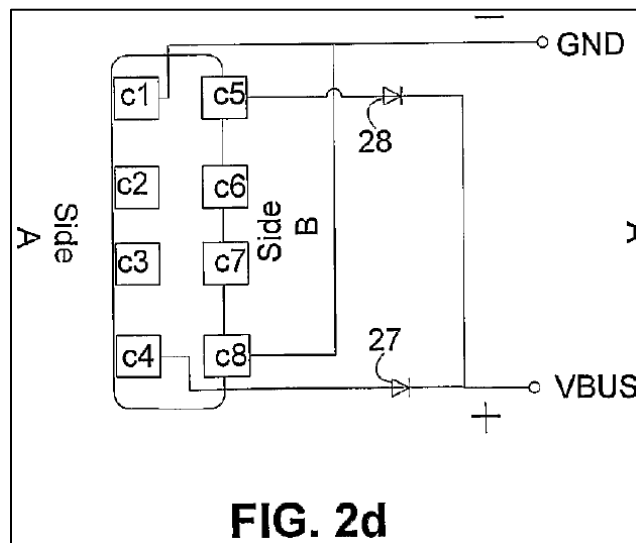


Figure 2d shows a schematic view of double-sided male connector 20, having contacts c1–c4 on *Side A* and contacts c5–c8 on *Side B*. *Id.* at 6:41–45. Also shown are diodes 27 and 28, each of which is placed between a  $V_{BUS}$  contact (i.e., c4 or c5) and where the  $V_{BUS}$  contacts are interconnected in male connector 20. *See id.* at 6:41–52, Fig. 2d. The arrangement of these

diodes prevents the short circuit problem, as explained in more detail below.  
*Id.*

When male connector 20 is inserted with *Side A* face up into female connector 25, male connector 20's (i) c4  $V_{BUS}$  contact engages female connector 25's  $V_{BUS}$  contact and (ii) c5  $V_{BUS}$  contact touches resilient leaf 11, which is grounded. Ex. 1001, 6:41–52, Fig. 2d. Thus, the c4 contact is at positive potential and the c5 contact is grounded. *Id.* Accordingly, diode 27 conducts current, whereas diode 28, which is reverse biased, opposes current flow. *Id.* When male connector 20 is inserted with *Side B* face up, the opposite occurs (i.e., contact c4 is grounded and contact c5 is at positive potential) with diode 28 allowing current flow and diode 27 opposing it. *Id.* at 6:53–57, Fig. 2d.

#### *D. Illustrative Claim*

Petitioner challenges claims 1–24 of the '825 patent. The parties identify claim 1 as the sole independent claim. See Pet. 34 (“Claim 1 is the sole independent claim.”); PO Resp. 1 (referencing claim 1 and its dependent claims). Claim 1 is illustrative of these challenged claims and is reproduced below:

1. A multi-contact connector supporting on opposite surfaces first and second sets of mutually opposed contacts wherein corresponding contacts in each set are electrically interconnected and are spatially aligned in a mutually opposed relationship allowing the connector to be connected in two opposed orientations to a corresponding FCCS-compatible receptacle supporting on an internal surface thereof a multi-contact data connector having only a single set of contacts that is compatible to either one of said sets of contacts such that identical functionality is obtained regardless of the orientation of the connector within the receptacle, said connector further comprising a short circuit prevention device to prevent an

electric short circuit between contacts of the receptacle on inserting the connector therein.

Ex. 1001, 17:11–24.

*E. Prior Art and Asserted Grounds*

Petitioner asserts that claims 1–24 of the '825 patent would have been unpatentable on the following grounds:

| <b>Claim(s)<br/>Challenged</b> | <b>35 U.S.C. §</b>  | <b>Reference(s)</b>                 |
|--------------------------------|---------------------|-------------------------------------|
| 1, 2, 4, 8, 9                  | 102(e) <sup>2</sup> | Harkabi <sup>3, 4</sup>             |
| 1, 2, 4, 8, 9                  | 103(a)              | Harkabi                             |
| 5                              | 103(a)              | Harkabi, EDN <sup>5</sup>           |
| 6                              | 103(a)              | Harkabi, Wiener <sup>6</sup>        |
| 3, 6                           | 103(a)              | Harkabi, USB 2.0 Spec. <sup>7</sup> |
| 7, 22                          | 103(a)              | Harkabi, Hisano <sup>8</sup>        |
| 13–15, 18                      | 103(a)              | Harkabi, Le <sup>9</sup>            |
| 11, 12                         | 103(a)              | Harkabi, Benayoun <sup>10</sup>     |
| 16, 17, 23, 24                 | 103(a)              | Harkabi, Kim <sup>11</sup>          |

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<sup>2</sup> The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 100 *et seq.* effective on March 16, 2013. Because the '825 patent issued from an application filed before March 16, 2013, we apply the pre-AIA versions of the statutory bases for unpatentability.

<sup>3</sup> US 7,361,059 B2, issued Apr. 22, 2008 (Ex. 1011).

<sup>4</sup> Petitioner established that Harkabi is prior art. *See* Pet. 22–30; Inst. Dec. 13–15. Patent Owner has not challenged Harkabi’s status as prior art. *See generally* PO Resp.; Mot. Amend.

<sup>5</sup> Davis, D. (1996, March 1). Overload and reverse-current circuitry protects battery and load. *EDN*, 165–171 (Ex. 1013).

<sup>6</sup> Wiener, P., & Witham, J. (1997). Meeting USB and IEEE1394 overcurrent protection requirements using PolySwitch devices. *WESCON/97 Conference Proceedings*, 442–475. doi: 10.1109/wescon.1997.632373 (Ex. 1014).

<sup>7</sup> Universal Serial Bus Specification (Rev. 2.0, Apr. 27, 2000) (Ex. 1015).

<sup>8</sup> US 2002/0091049 A1, published July 11, 2002 (Ex. 1016).

<sup>9</sup> US 6,883,718 B1, issued Apr. 26, 2005 (Ex. 1017).

<sup>10</sup> US 6,725,302 B1, issued Apr. 20, 2004 (Ex. 1018).

<sup>11</sup> US 2002/0169978 A1, published Nov. 14, 2002 (Ex. 1020).

| Claim(s)<br>Challenged | 35 U.S.C. § | Reference(s)                     |
|------------------------|-------------|----------------------------------|
| 19                     | 103(a)      | Harkabi, Funahashi <sup>12</sup> |
| 20, 21                 | 103(a)      | Harkabi, Poo <sup>13</sup>       |

## ANALYSIS

### A. Legal Standards

#### 1. Anticipation

A patent claim is unpatentable under 35 U.S.C. § 102 if “the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.”

*Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000). “A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference.” *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 958 (Fed. Cir. 2014) (citing *Schering Corp. v. Geneva Pharm.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003)). Moreover, the reference must also “disclose[] within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim.” *Net MoneyIN, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). However, “the reference need not satisfy an *ipsissimis verbis* test.” *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). We analyze the ground based on anticipation in accordance with the above-stated principles.

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<sup>12</sup> US 2002/0126882 A1, published Sept. 12, 2002 (Ex. 1019).

<sup>13</sup> US 2003/0149816 A1, published Aug. 7, 2003 (Ex. 1021).

## 2. *Obviousness*

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under 35 U.S.C. § 103 that requires consideration of four factors: (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of non-obviousness such as “commercial success, long-felt but unsolved needs, failure of others, etc.” *Id.* at 17–18. “While the sequence of these questions might be reordered in any particular case,” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007), the U.S. Court of Appeals for Federal Circuit has “repeatedly emphasized that an obviousness inquiry requires examination of all four *Graham* factors and that an obviousness determination can be made only after consideration of each factor,” *Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1335 (Fed. Cir. 2016), *overruled on other grounds by Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017) (en banc). We note that, with respect to the fourth *Graham* factor, the parties have not presented argument or evidence directed to secondary considerations of nonobviousness. *See generally* Pet.; PO Resp. The analysis below addresses the first three *Graham* factors.

### *B. Level of Ordinary Skill in the Art*

Factors pertinent to a determination of the level of ordinary skill in the art include (1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field. *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–97 (Fed. Cir. 1983) (citing

*Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, these factors are not exhaustive, but are merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. Ltd, Inc. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007).

Petitioner asserts a person having ordinary skill in the art at the time of the invention of the '825 patent would have had “at least (1) a bachelor’s degree in electrical engineering, computer engineering, mechanical engineering, or a related field and at least three years of work experience dealing with USB and other computer interface protocols, or (2) five or more years of experience in those technologies without a bachelor’s degree.” Pet. 17 (citing Ex. 1002 ¶¶ 40–45; *G.B.T. Inc. v. Walletex Microelectronics Ltd.*, IPR2018-00326, Paper 14 at 9–10 (PTAB July 5, 2018) (Institution Decision)). “Patent Owner does not dispute Petitioner’s characterization of the level of ordinary skill in the art.” PO Resp. 2.

Accordingly, we adopt Petitioner’s proposed level of ordinary skill, except that we delete the qualifier “or more” to eliminate vagueness as to the amount of practical experience. The qualifier expands the range indefinitely without an upper bound, and thus precludes a meaningful indication of the level of ordinary skill in the art. Therefore, a person having ordinary skill in the art would have had either (1) a bachelor’s degree in electrical engineering, computer engineering, mechanical engineering, or a related field and three years of work experience dealing with USB and other computer interface protocols, or (2) five years of experience in those technologies without a bachelor’s degree.

### C. Claim Construction

In this *inter partes* review, we construe claim terms in this unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2018).<sup>14</sup> “Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.” *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016). In addition, we may not “construe claims during [an *inter partes* review] so broadly that its constructions are unreasonable under general claim construction principles.” *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015) (emphasis omitted), *overruled on other grounds by Aqua Prods.*, 872 F.3d 1290.

Petitioner argues that no claim terms require an express construction. Pet. 18. Patent Owner proposes a construction for the term “short circuit prevention device.” *See generally* PO Resp. 3–8.

Based on the arguments presented during the trial regarding the patentability of the claims, we need only construe the term “short circuit prevention device.”

#### 1. The Parties’ Arguments

Patent Owner argues that, based on an alleged disclaimer, “short circuit prevention device” as recited in claim 1 means “a device that

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<sup>14</sup> The Board applies the district court claim construction standard to petitions filed on or after November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (codified at 37 C.F.R. § 42.100(b) (2019)). Because Petitioner filed its petition before November 13, 2018, we apply the broadest reasonable interpretation standard.

prevents a short circuit upon an unintended contact between the inactive contacts of the claimed connector and a metallic portion of the claimed receptacle.” PO Resp. 8. Specifically, Patent Owner argues statements made during the prosecution of the ’825 patent distinguishing Mercer<sup>15</sup> and Guim<sup>16</sup> acted as a prosecution disclaimer or, at the very least, are “relevant” to a proper construction. *Id.* at 4; *see also* PO Sur-reply 1–2 (arguing the statements are relevant to claim construction, even absent a disclaimer).

According to Patent Owner, “the [E]xaminer contended that a ‘short circuit prevention device’ was ‘common knowledge, well known and widely used in the art of electrical connectors,’ and that ‘[i]t would have been obvious to one of ordinary skill in the art at the time of the instant invention to provide such a feature in order to prevent short circuit [*sic*].” PO Resp. 4 (quoting Ex. 2006, 22–23 (prosecution history of the ’825 patent)). Patent Owner further argues that, in response to the rejection, “the patentee made several clear and unambiguous statements regarding the meaning of ‘short circuit prevention device’ in the context of the claimed invention, which were presented to distinguish both Guim and Mercer, as well as other prior art references like them.” *Id.* at 5; *see also id.* at 5–6 (discussing statements).<sup>17</sup> According to Patent Owner,

the patentee explained that Mercer cannot need a “short circuit prevention device” because, in Mercer’s design, the inactive side of the connector is not at risk of touching any metal aspect of the alleged receptacle, and thus there was “simply no possibility for the inactive contacts in Mercer becoming shorted.”

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<sup>15</sup> US 4,781,610, issued Nov. 1, 1988 (Ex. 3001).

<sup>16</sup> US 4,607,209, issued Aug. 19, 1986.

<sup>17</sup> All emphasis of the names of references have been omitted.

*Id.* at 7 (quoting Ex. 2006, 10–11); *see also* PO Sur-reply 2–3 (arguing the same). Patent Owner further argues that that “[t]he patentee<sup>[18]</sup> then reiterated the same clear and unmistakable disclaimer yet again in discussing Guim.” PO Resp. 7.

Petitioner counters that none of Patentee’s statements set forth a definition of what is meant by “short circuit prevention device.” Pet. Reply 6–9. Specifically, Petitioner argues that “there is nothing in the office action response that refers or relates to the ‘upon an unintended contact’ between connector contacts and receptacle.” *Id.* at 6. According to Petitioner, the section cited by Patent Owner (PO Resp. 5–6) “merely reiterates that the active contacts being shorted must be avoided,” which was identified in the background of the ’825 patent. Pet. Reply 6–7 (citing Ex. 1001, 2:44–53).

Petitioner further argues that Patentee relied on amending the claims to distinguish Mercer, as opposed to relying on argument. Pet. Reply 4–5. Specifically, Petitioner argues “that the amendments made ‘clear that the corresponding contacts in each set of Mercer cannot possibly be electrically interconnected.’” *Id.* at 5 (emphasis omitted) (quoting Ex. 2006, 11).

Petitioner also argues that Patentee focused its arguments on whether there was a motivation to combine Mercer and Guim. Pet. Reply 5–6, 7–9. According to Petitioner, Patentee argued that, because the female connector of Mercer was in a terminal block rather than a receptacle, there was no possibility of the inactive contacts being shorted, and thus no need to add short circuit protection. *Id.* at 7–8. Petitioner further argues that, because

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<sup>18</sup> For consistency with the parties’ briefing, we use the term “Patentee” to refer to statements made by Applicant during prosecution.

Patentee's description of Guim was incorrect, those statements cannot be relied on as the basis for a disclaimer. *Id.* at 8–9.

Petitioner also argues that the Notice of Allowability demonstrates that the Examiner did not rely on an express definition of “short circuit prevention device.” Pet. Reply 10. According to Petitioner, the Notice of Allowability made no reference to the “short circuit prevention device;” instead, the Examiner focused on Patentee's argument about the Mercer contacts having different functionality. *Id.* (citing Ex. 1005, 5).

In response, Patent Owner argues that it makes no difference that the disavowal describes what is also described in the '825 patent. PO Sur-reply 3. According to Patent Owner, “[i]t is entirely proper to limit the meaning of a term based on what is in the patent's disclosure.” *Id.*

Patent Owner also disputes Petitioner's argument (Pet. Reply 7) that the statements were made for the purpose of arguing there was no motivation to combine Mercer and Guim (PO Sur-reply 3–4). According to Patent Owner, “the issue is that in Mercer, ‘the problem of short-circuit protection’ cannot arise in the manner that the claimed invention prevents, i.e., there cannot be a short circuit caused by the inactive contacts and the metal shielding of the female receptacle because there is no metal shielding in Mercer.” PO Sur-reply 4. Therefore, Patent Owner argues, “the patentee explicitly narrowed the sort of short circuit being prevented in the claims.” *Id.* (citing Ex. 2006, 10).

Patent Owner also disputes Petitioner's characterization of Guim. PO Sur-reply 5–6. According to Patent Owner, Patentee's description of Guim during prosecution is accurate. *Id.* at 5–6. Patent Owner further argues that what is relevant is “[P]atentee's demonstrated intent” and not Petitioner's

understanding of the reference. *Id.* at 6 (emphasis omitted) (citing *Intellectual Ventures I LLC v. T-Mobile, Inc.*, 902 F.3d 1372, 1378–79 (Fed. Cir. 2018)).

Patent Owner also argues that the Examiner’s comments in the Notice of Allowability are irrelevant. PO Sur-reply 6. According to Patent Owner, “[i]t is the patentee’s statements that give rise to disavowal, not the statements of the examiner.” *Id.* (citing *Intellectual Ventures*, 902 F.3d at 1378–79).

## 2. *Our Analysis*

For the reasons set forth below, we conclude that Patent Owner has not sufficiently shown that the arguments made during the prosecution of the ’825 patent limit the scope of the “short circuit prevention device” in this way. We therefore do not agree with Patent Owner that “short circuit prevention device” means “a device that prevents a short circuit upon an unintended contact between the inactive contacts of the claimed connector and a metallic portion of the claimed receptacle.”

To place Patentee’s statements in their proper context, we begin our analysis with the Examiner’s obviousness rejection of the claims prior to the response that is the focus of Patent Owner’s arguments. As discussed in detail below, Patentee’s arguments during prosecution were directed not to whether Mercer taught a “short circuit prevention device”, but that Mercer did not teach a connector with identical functionality, regardless of the orientation of the connector.

In an Office Action, the Examiner rejected the then-pending claims as obvious over Mercer and Guim. Ex. 2006, 22–23. According to the Examiner, Mercer taught all of the limitations of the then-pending claims,

except for the short circuit prevention device. *Id.* at 22. The Examiner further found that “[s]uch a device is common knowledge, well known and widely used in the art of electrical connectors” and that Guim teaches such a device. *Id.* The Examiner further found that a person having ordinary skill in the art would have combined Guim’s short circuit prevention device with Mercer “in order to prevent short circuit which is common knowledge, well known and widely used in the art of electrical connectors.” *Id.* at 22–23.

The Examiner also rejected the pending claims as indefinite. Ex. 2006, 21–22. Specifically, the Examiner determined that the limitation “aligned in anti-phase relationship” was not clear. *Id.* at 22.

In response to the Examiner’s rejections, Patentee amended the claims to overcome the indefiniteness rejection and “to distinguish more clearly over Mercer, in connection with which the following comments are relevant.” Ex. 2006, 8; *see also id.* at 3 (amending pending claim 121). As amended, claim 121 recited as follows:

**121. (Currently amended)** A multi-contact connector supporting on opposite surfaces first and second sets of mutually opposed contacts wherein corresponding contacts in each set are electrically interconnected and are spatially aligned in anti-phase a mutually opposed relationship allowing the connector to be connected in two opposed orientations to a corresponding FCCS-compatible receptacle supporting on an internal surface thereof a multi-contact data connector having only a single set of contacts that is compatible to either one of said ~~set~~sets of contacts such that identical functionality is obtained regardless of the orientation of the connector within the receptacle, said connector further comprising a short circuit prevention device to prevent an electric short circuit between contacts of ~~an FCCS-compatible~~ the receptacle on inserting the connector therein.

*Id.* at 3.

In the accompanying remarks, Patentee's arguments regarding Mercer focused on the structure and functionality of Mercer's connector and distinguishing Mercer based on the amended claim language:

Merger does indeed show a double-sided plug 19 having pins that project from both surfaces and allow the plug to be inserted in either of two orientations into a female connector. However, the female connector is a terminal block 18, i.e. not in the form of a receptacle having contacts supported on an internal surface thereof as now defined in claim 121. Likewise, although it is true that the plug 19 can be inserted in either of two orientations into the terminal block 18, this is done precisely to achieve different functionality.

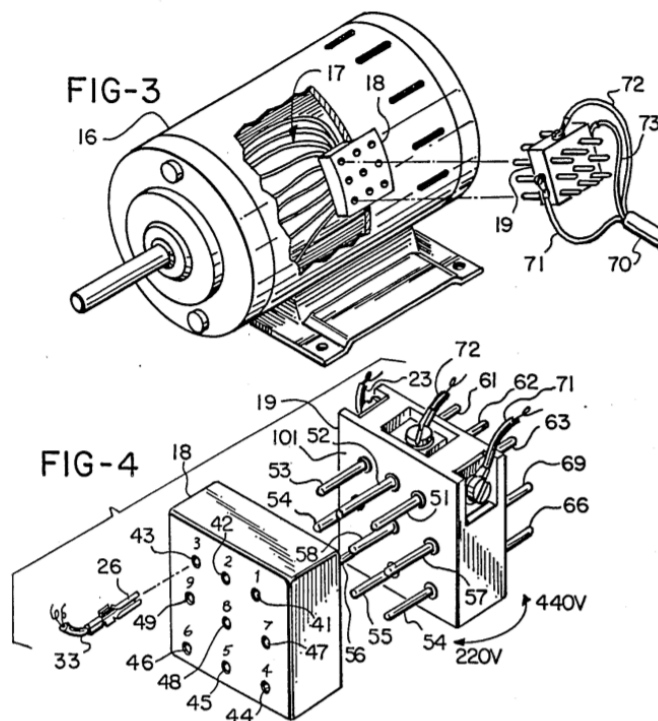
Ex. 2006, 8–9. That is, with Mercer, “[o]ne set of pins is interconnected for 220 volt operation while the other set of pins is interconnected for 440 volt operation.” *Id.* at 9 (quoting Ex. 3001, 3:50–52). According to Patentee, that functionality “teaches away from the invention, where a principal object is to allow the plug to be inserted in either orientation within the receptacle and achieve identical functionality.” *Id.* Thus, Patentee's arguments were directed not to whether Mercer taught a “short circuit prevention device,” but that Mercer did not teach a connector with identical functionality, regardless of the orientation of the connector.

Patentee then focused on why a person having ordinary skill in the art would not have combined Mercer and Guim. Specifically, as discussed below, Patentee argued that, because the “inactive contacts” are not within a receptacle, there is no possibility of a short circuit and, accordingly, no reason to add a short circuit prevention device. First, Patentee discussed “the nature of the short circuit against which the connector according to claim 121 is protected.” Ex. 2006, 10. According to Patentee, the short

circuit problem is caused by the “inactive contacts” touching the metal shielding on the receptacle:

The short circuit can arise precisely because it is normal for an internal surface of the female receptacle opposite the contacts to be a metallic shielding. In this case, the very act of providing mutually complementary contacts on both surfaces of the plug can cause the inactive set of contacts to touch the metal shielding. However, the contacts on both surfaces of the connector are interconnected and therefore if inactive contacts on one surface touch the metal shielding of the receptacle, this will cause the active contacts to be shorted via the metal shielding.

*Id.* But, according to Patentee, this problem cannot arise in Mercer because the “female connector is in the form of a terminal block rather than a receptacle and the inactive contacts are directed away from the terminal block.” *Id.* That is, as shown in Mercer’s Figures 3 and 4, reproduced below, the inactive contacts are not within the receptacle.



Ex. 3001, Figs. 3, 4. Mercer's Figure 3 "is a pictorial illustration of a connection of a three phase motor to a power supply in accordance with [Mercer]" and Figure 4 "is an enlarged illustration of the engagement relation between a terminal block and a reversible connector." *Id.* at 2:19–24. Because of the structure of Mercer, Patentee argued "[t]here is therefore no reason to propose the use of a short-circuit protection in Mercer." Ex. 2006, 11. In other words, Patentee argued that, because the "inactive contacts" are not within a receptacle, there is no possibility of a short circuit and, accordingly, no reason to add a short circuit prevention device. *See* Ex. 2006, 11–12.

Patentee also argued that Mercer does not have contacts that are electrically interconnected. Ex. 2006, 11

In summary, Patentee focused its arguments on the structure and functionality of the Mercer contacts and the lack of a reason to add a short circuit prevention device to Mercer. Patentee did not direct its arguments to the meaning of a "short circuit prevention device" or in any way limit the meaning of that limitation. This is confirmed by the Examiner's statement in the Notice of Allowability. *See* Ex. 1005, 5 (stating that the "[p]rior art does not [teach] a multi-contact connector having two sets of contacts interconnected, spatially aligned and mutually opposed relationship wherein the connector could be connected to a receptacle in two opposed orientations and provide identical functions"). Thus, in addition to the Patentee's own statements discussed *supra*, the Notice of Allowability supports the conclusion that Patentee did not expressly disclaim claim coverage. *See Dasso Int'l, Inc. v. MOSO N. Am., Inc.*, No. 1:17-cv-01574-RGA, 2019 WL

2135855, at \*5 (D. Del. May 16, 2019) (concluding the prosecution history, including the Notice of Allowability, did not support a disclaimer).

Nor do we agree with Patent Owner that Patentee’s arguments regarding Guim limit the scope of the claim.<sup>19</sup> During prosecution, Patentee argued that the diode in Guim had a different purpose than the diode of the short circuit prevention device of claim 121:

Even apart from this, it does not appear Guim et al. teaches short-circuit protection as averred by the Examiner. . . . It is true that the short-circuit protection in the invention as claimed in claim 121 also employs diodes that prevent current flow: **but this is done not for the purpose of protecting against incorrect polarity as is done in Guim et al. but to protect against a short circuit caused by inactive contacts shorting the metal shielding of the female receptacle.**

Ex. 2006, 11 (emphasis in original omitted, emphasis added). However, the highlighted sentence simply discusses the need to protect against a short circuit; Patentee does not discuss how that protection is achieved or limit it to situations where there is unintended contact between an inactive contact and the receptacle. That is, there is nothing in the paragraph above that would indicate that the claim limitation does not cover protecting a short circuit by preventing an unintended contact.

Accordingly, we do not agree—based on either disclaimer or any other claim construction doctrine—that the “short circuit prevention device” is limited to “a device that prevents a short circuit upon an *unintended*

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<sup>19</sup> We agree with Patent Owner that Patentee’s statements—even if based on an incorrect understanding of the reference—control. *See Intellectual Ventures*, 902 F.3d at 1378–79 (disavowal is determined by whether the “patentee demonstrated an intent to deviate from the ordinary and accustomed meaning of a claim term”) (internal quotations omitted)).

contact between the inactive contacts of the claimed connector and a metallic portion of the claimed receptacle,” as Patent Owner argues. Instead, we apply the plain and ordinary meaning of a “short circuit prevention device” because both the specification of the ’825 patent and the prosecution history pertaining to this patent identified above use this term in a manner that it is broad enough to encompass “any device that prevents a short circuit.” *See, e.g.*, Ex. 1001, 1:62–2:2 (disclosing how the prior art protects “against short circuit using a comparison circuit configured to detect a shortcut to one or more predetermined voltage sources”), 6:61–7:7 (disclosing that either “diodes” or “relay unit 31” may be used to prevent a short circuit).

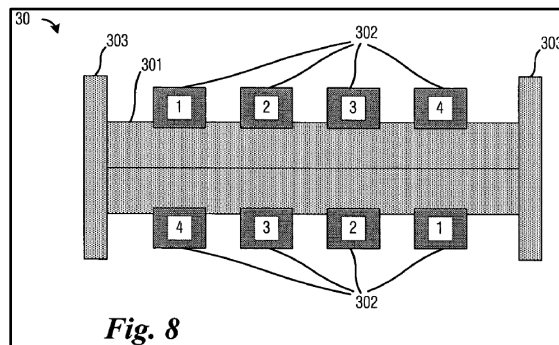
*D. Harkabi*

*1. Summary of Harkabi*

Harkabi discloses double-sided USB plugs for use in standard USB receptacles. *E.g.*, Ex. 1011, 3:1–17. Harkabi discusses two different embodiments: the “SLIM” embodiment and the “FLEX” embodiment. *Id.* at 3:8–24.

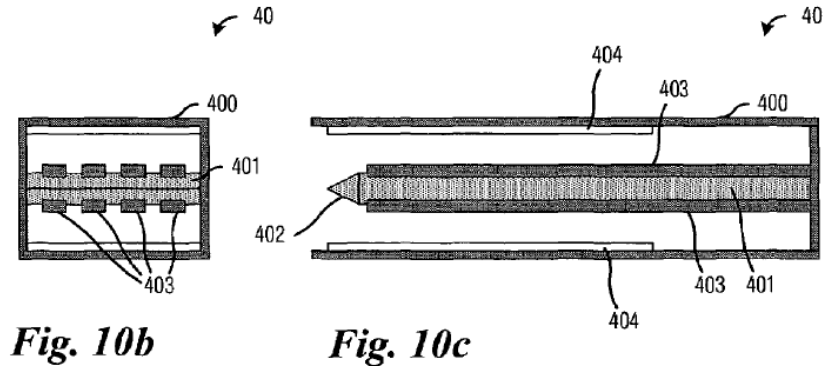
Harkabi’s double-sided USB plugs are capable of being inserted in either orientation into standard USB receptacles. Ex. 1011, 3:1–24. For Harkabi’s SLIM embodiment, this capability arises, in part, from eliminating the shell found on a standard USB plug in favor of having just a tongue board. *Id.* at 3:10–14, 4:47–59. The tongue board has a set of contacts on each of its sides (i.e., it is double-sided). *Id.* at 5:1–4. In order to assure that each of the contacts are mated with the correct contacts in a USB receptacle, regardless of the tongue board’s orientation, the contacts on each side of the tongue board are “oppositely aligned.” *Id.* at 5:4–8. Figure 8, shown below,

illustrates a double-sided tongue board in accordance with Harkabi's SLIM embodiment. *Id.* at 4:1–4.



More specifically, Figure 8 illustrates “a schematic diagram of an exemplary SLIM embodiment . . . in a side view, including the layout of the electrical contact[s].” *Id.* As shown above, USB plug 30 comprises tongue board 301, having a set of oppositely aligned contacts 302 (contacts 1–4) on each of its sides. *Id.* at 5:1–12, Fig. 8. Also shown are “protective edges 303[,which] protrude from tongue 301 a little more than the electrical contacts 302 do, and thus prevent physical connection to [the USB receptacle’s] housing 100 that might otherwise cause a short circuit.” *Id.* at 5:27–30. In other words, to avoid short-circuiting the electrical contacts 302 “on the opposite side of tongue 301 that are not participating in the electrical mating, protective edges 303 are used.” *Id.* at 5:23–26.

The FLEX embodiment is shown in Harkabi's Figures 10b and 10c, reproduced below. Ex. 1011, 4:7–8, 5:31–33.



Harkabi's Figures 10b and 10c are "a schematic diagram of an exemplary FLEX embodiment." *Id.* at 4:7–8.

The plug 40 includes a shell 400, a flexible tongue 401, a tongue tip 402, a plurality of contacts 403 on both sides of flexible tongue 401, and insulating strips 404. The flexible tongue 401 is positioned inside shell 400, in the center of the lateral axis of shell 400.

*Id.* at 5:34–39.

## 2. Analysis of Claim 1 (Anticipation)

For the most part Patent Owner does not dispute that Harkabi discloses the limitations of claim 1. The dispute lies in the one recitation "a short circuit prevention device to prevent an electric short circuit between contacts of the receptacle on inserting the connector therein." We refer to this *infra* as the "short circuit prevention device" limitation.

### a) Undisputed Limitations

The preamble of claim 1 recites "[a] multi-contact connector." Ex. 1001, 17:11. Petitioner argues that, to the extent the preamble is limiting, Harkabi discloses that limitation.<sup>20</sup> Pet. 34–35. Specifically, Petitioner

<sup>20</sup> Neither Petitioner nor Patent Owner address whether the preamble is limiting. Because Petitioner has shown that the recitation in the preamble is satisfied by the prior art, there is no need to determine whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017.

argues that Harkabi's SLIM embodiment is a multi-contact connector with "two sets of contact points," which can be "correctly inserted into host receptacle in two alignments." *Id.* (emphasis omitted) (quoting Ex. 1011, 3:10–14) (citing Ex. 1002 ¶ 123).

Claim 1 further recites the multi-contact connector "supporting on opposite surfaces first and second sets of mutually opposed contacts." Ex. 1001, 17:11–12. Petitioner argues Harkabi discloses that limitation. Pet. 35–36 (citing Ex. 1011, 3:10–14, 3:66–67, 4:57–61, 6:4–21; Ex. 1002 ¶ 124). Specifically, Petitioner directs us to Harkabi's Figure 7b, which Petitioner argues "shows a head-on view of the SLIM embodiment plug 30 that has a tongue 301 and two sets of contacts 302 on opposite sides." *Id.* at 35.

Claim 1 further recites "wherein corresponding contacts in each set are electrically interconnected and are spatially aligned in a mutually opposed relationship." Ex. 1001, 17:13–15. Petitioner argues Harkabi discloses that limitation. Pet. 36–38 (citing Ex. 1011, 5:4–9, 6:4–21, Figs. 8, 14a, 14b; Ex. 1002 ¶¶ 125–127). Specifically, Petitioner directs us to Harkabi's Figure 8 which "shows how the top set of contacts {1, 2, 3, 4} are mutually opposed to the bottom set of contacts {4, 3, 2, 1}." *Id.* at 38.

Claim 1 further recites

allowing the connector to be connected in two opposed orientations to a corresponding FCCS-compatible receptacle supporting on an internal surface thereof a multi-contact data connector having only a single set of contacts that is compatible to either one of said sets of contacts such that identical functionality is obtained regardless of the orientation of the connector within the receptacle.

Ex. 1001, 17:15–21. Petitioner argues Harkabi discloses that limitation. Pet. 38–40 (citing Ex. 1011, 4:47–52, 4:62–67, 5:1–9, Figs. 9a–9c; Ex. 1002 ¶¶ 128–129). Specifically, Petitioner argues that “that the purpose of the SLIM embodiment connector is to allow it to be inserted in two opposed orientations into a USB receptacle and that identical functionality is obtained regardless of the orientation of the SLIM connector in the USB receptacle.” *Id.* at 38–39. Petitioner also directs us to Harkabi’s Figures 9a and 9b, which Petitioner argues depicts a USB receptacle with a single set of contacts that “is compatible with either of the two sets of contacts” on the connector. *Id.* at 39–40 (citing Ex. 1011, 4:62–5:4, Figs. 9a, 9b; Ex. 1002 ¶¶ 128–129).

Patent Owner does not dispute Petitioner’s contention that Harkabi discloses each of the limitations recited above arranged in the order set forth in claim 1. *See generally* PO Resp.

Based on the undisputed evidence before us and the reasons set forth in the Petition, Pet. 34–40, we find that Harkabi discloses the limitations of claim 1 discussed above.

*b) The Disputed “Short Circuit Prevention Device” Limitation*

Claim 1 further recites “said connector further comprising a short circuit prevention device to prevent an electric short circuit between contacts of the receptacle on inserting the connector therein.” Ex. 1001, 17:21–24. Petitioner argues Harkabi discloses that limitation. Pet. 41. Specifically, Petitioner identifies protective edges 303 of Harkabi’s SLIM embodiment as shown in Figure 8 as a short circuit protective device, which will “prevent an electric short circuit from occurring when the USB plug is inserted into the

USB receptacle.” *Id.*; *see also* Ex. 1011, 5:23–30 (describing how protective edges 303 can prevent a short circuit).

Patent Owner argues that Harkabi’s protective edges are not a short circuit protection device based on its proposed claim construction. *See* PO Resp. 8–12; PO Sur-Reply 8–9. Specifically, Patent Owner argues that “Harkabi’s . . . protective edges are meant to avoid an unintended contact in the first place, *not* to prevent a short circuit from occurring *if and when* an unintended contact between the inactive contacts of the alleged connector and a metallic portion of the alleged receptacle occurs.” PO Resp. 10; *see also id.* at 12 (arguing Harkabi attempts to avoid the possibility of an unintended contact).

Based on the record, Petitioner has shown that the protective edges of Harkabi’s SLIM embodiment are a “short circuit protection device” as recited in claim 1. Specifically, Harkabi describes how the SLIM embodiment’s protective edges “prevent physical connection to housing 100 that might otherwise cause a short circuit.” Ex. 1011, 5:27–30. In other words, by preventing an unintentional contact, the protective edges prevent a short circuit from occurring. *See id.*; Ex. 1002 ¶¶ 130–131. This comports with our construction of a “short circuit prevention device” as “any device that prevents a short circuit.” *See supra* Section II.C.2.

Patent Owner does not dispute this description of how Harkabi operates. *See* PO Resp. 10 (agreeing that Harkabi’s “protective edges are meant to avoid an unintended contact”). Instead, Patent Owner relies on its proposed claim construction to argue that Harkabi’s protective edges are not sufficient. However, we did not adopt Patent Owner’s proposed

construction. Accordingly, Patent Owner's argument is not commensurate with the scope of the claim. *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982).

We have considered the entirety of the evidence submitted by the parties and determine that Petitioner has shown by a preponderance of the evidence that claim 1 of the '825 patent is anticipated by Harkabi.

3. *Analysis of Claims 2, 4, 8, and 9 (Anticipation)*

Claim 2 depends from claim 1 and recites that “the first and second set of contacts are supported on a planar substrate.” Ex. 1001, 17:25–26. Petitioner argues Harkabi discloses the additional limitation recited in claim 2. *See* Pet. 42–43. Specifically, Petitioner argues that “[t]he SLIM embodiment teaches that the first and second sets of contacts are supported on a planar substrate, specifically tongue 301 in the SLIM embodiment.” *Id.* at 42 (citing Ex. 1011, 4:57–61); *see also* Ex. 1011, Figs. 7b, 7d. Petitioner also argues that “the SLIM embodiment may be an integral part of a printed circuit board 500, which is another planar substrate.” Pet. 42 (citing Ex. 1011, 6:4–21, Figs. 14a, 14b; Ex. 1002 ¶¶ 133–135).

Claim 4 depends from claim 1 and further recites that the connector is “USB-compatible or mini-USB-compatible.” Ex. 1001, 17:31–32. Petitioner argues Harkabi discloses the additional limitation recited in claim 4. *See* Pet. 43. Specifically, Petitioner argues that “[t]he SLIM embodiment also teaches that it is ‘an improvement of existing USB series “A” plugs’ and is used for ‘insertion of the improved plug connector for devices operable with the USB into USB host computers.’” *Id.* (quoting Ex. 1011, 4:47–52) (citing Ex. 1002 ¶¶ 136–137).

Petitioner contends claim 8 depends from claim 1<sup>21</sup> and recites “[a] female connector adapted for accommodating the connector according to claim 1.” Ex. 1001, 17:40–41. Petitioner argues Harkabi discloses the limitation recited in claim 8. *See* Pet. 43–45. Specifically, Petitioner argues that Harkabi discloses “that the SLIM embodiment is designed to connect to a USB receptacle 100” and that the ’825 patent “explains that a USB receptacle is a ‘female connector.’” *Id.* at 44–45 (citing Ex. 1001, 6:17–20; Ex. 1011, 4:62–67, 5:23–30; Ex. 1002 ¶¶ 138–141).

Petitioner contends claim 9 depends from claim 1 and recites “[a] portable device comprising an electric circuit coupled to the connector according to claim 1.” Ex. 1001, 18:1–2. Petitioner argues Harkabi discloses the limitation recited in claim 9. Pet. 45–46. Specifically, Petitioner argues “Harkabi discloses that its SLIM embodiment plug is intended to be used with computer peripherals (i.e., a portable device with an electric circuit).” *Id.* at 45 (citing Ex. 1011, 6:4–11).

Patent Owner does not separately address the additional limitations recited in claims 2, 4, 8, and 9. *See generally* PO Resp.

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<sup>21</sup> Both Petitioner and Patent Owner contend that the ’825 patent only has a single independent claim. *See* Pet. 44 n.3 (“Petitioners contend that Claims 8 and 9 are not independent claims . . .”); PO Resp. 8 (identifying claim 1 as “the sole independent claim”). It is not clear that claims 8 and 9 depend from claim 1. *See G.B.T. Inc. v. Wallex Microelectronics Ltd.*, IPR2018-00326, Paper 14 at 25 (PTAB July 5, 2018) (Institution Decision) (requesting the parties to “clarify whether they contend claims 8 and 9 are independent or dependent claims, and their bases for their contention”). Because both Patent Owner and Petitioner contend that claims 8 and 9 depend from claim 1, and we would reach the same determinations if claims 8 and 9 were independent claims, we need not determine whether claims 8 and 9 are independent or depend from claim 1.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 2, 4, 8, and 9 of the '825 patent are anticipated by Harkabi.

4. *Analysis of Claim 1 (Obviousness)*

a) *Undisputed Limitations*

The preamble of claim 1 recites “[a] multi-contact connector.” Ex. 1001, 17:11. Petitioner argues that, to the extent the preamble is limiting, Harkabi teaches that limitation. Pet. 47. Specifically, Petitioner argues that Harkabi’s FLEX embodiment is a multi-contact connector. *Id.* (citing Ex. 1011, 5:31–33, 3:19–22; Ex. 1002 ¶ 145).

Claim 1 further recites the multi-contact connector “supporting on opposite surfaces first and second sets of mutually opposed contacts.” Ex. 1001, 17:11–11. Petitioner argues Harkabi teaches that limitation. Pet. 48–49 (citing Ex. 1011, 3:22–24, 5:34–36, 5:64–6:1; Ex. 1002 ¶¶ 146–147, 149–150). Specifically, Petitioner argues that Harkabi teaches that “[t]he plug 40 includes a shell 400, a flexible tongue 401, a tongue tip 402, **a plurality of contacts 403 on both sides of flexible tongue 401**, and insulating strips 404.” *Id.* at 48 (quoting Ex. 1011, 5:34–36) (citing Ex. 1011, 3:22–24). Petitioner further argues that “the FLEX embodiment teaches that the two sets of contacts are mutually opposed.” *Id.* (citing Ex. 1002 ¶¶ 146–147).

Claim 1 further recites “wherein corresponding contacts in each set are electrically interconnected and are spatially aligned in a mutually opposed relationship.” Ex. 1001, 17:13–15. Petitioner argues that a person having ordinary skill in the art would have understood “that the contacts on

the FLEX embodiment are electrically interconnected.” Pet. 48 (citing Ex. 1011, Fig. 11; Ex. 1002 ¶ 148).

Alternatively, Petitioner argues that Harkabi’s SLIM embodiment “teaches that the corresponding contacts in each set are electrically interconnected because the contacts 302 in the SLIM embodiment are connected to the same internal electronics 501.” Pet. 48 (citing Ex. 1011, 6:4–21). Petitioner further argues that a person having ordinary skill in the art would have combined that “teaching from the SLIM embodiment with the FLEX embodiment because this would have been the use of a known technique, taught on the same page of Harkabi, to improve a similar device.” *Id.* at 48–49 (citing Ex. 1011, 6:4–30; Ex. 1002 ¶ 149).

Petitioner further argues “that the corresponding contacts in the FLEX embodiment are spatially aligned in a mutually opposed relationship.” Pet. 49 (citing Ex. 1011, 5:64–6:1; Ex. 1002 ¶¶ 149–150).

Claim 1 further recites

allowing the connector to be connected in two opposed orientations to a corresponding FCCS-compatible receptacle supporting on an internal surface thereof a multi-contact data connector having only a single set of contacts that is compatible to either one of said sets of contacts such that identical functionality is obtained regardless of the orientation of the connector within the receptacle.

Ex. 1001, 17:15–21. Petitioner argues Harkabi teaches that limitation.

Pet. 49–50 (citing Ex. 1011, 5:39–59, 5:64–6:3; Ex. 1002 ¶¶ 151–152).

Specifically, Petitioner argues Harkabi’s “FLEX embodiment is designed to be connected in two opposed orientations to a USB receptacle.” *Id.* at 49 (citing Ex. 1011, 5:39–59, 5:64–6:3). Petitioner further argues that “a USB receptacle is an ‘FCCS-compatible receptacle’” and it “supports on an

internal surface a multi-contact data connector having only a single set of contacts such that identical functionality is obtained when the FLEX embodiment plug is inserted in either of two orientations.” *Id.* at 50 (citing Ex. 1001, 17:1–9; Ex. 1002 ¶¶ 151–152).

Patent Owner does not dispute Petitioner’s contention that Harkabi’s FLEX embodiment modified by the SLIM embodiment teaches each of the limitations recited above. *See generally* PO Resp.

Based on the undisputed evidence before us and the reasons set forth in the Petition, Pet. 47–50, we find that a person of ordinary skill in the art would have modified Harkabi’s FLEX embodiment in the manner suggested in the Petition and that such a modified device would have accounted for all of the limitations identified in this section.

*b) The Disputed “Short Circuit Protective Device” Limitation*

Claim 1 further recites “said connector further comprising a short circuit prevention device to prevent an electric short circuit between contacts of the receptacle on inserting the connector therein.” Ex. 1001, 17:21–24. Petitioner argues Harkabi teaches that limitation. Pet. 50–51. Specifically, Petitioner argues “Harkabi’s FLEX embodiment provides ‘insulating strips 404’ to prevent a short circuit between contacts of the receptacle when the FLEX embodiment plug is inserted into a USB receptacle.” *Id.* at 50 (citing Ex. 1011, 5:60–63). Petitioner further argues that Harkabi’s Figure 13c “shows the insulation strips 404 lining the inside of shell 400 that prevent the non-mated contacts from touching the shell 400 and causing an electric short circuit.” *Id.* (citing Ex. 1011, Fig. 13c); *see also* Ex. 1002 ¶¶ 153–154.

Patent Owner argues that Harkabi’s insulating strips are not a “short circuit protection device” based on its proposed claim construction. *See* PO

Resp. 8–12; PO Sur-Reply 8–9. Specifically, Patent Owner argues that “Harkabi’s insulating strips . . . are meant to avoid an unintended contact in the first place, *not* to prevent a short circuit from occurring *if and when* an unintended contact between the inactive contacts of the alleged connector and a metallic portion of the alleged receptacle occurs.” PO Resp. 10; *see also id.* at 12 (arguing Harkabi attempts to avoid the possibility of an unintended contact).

Based on the record, Petitioner has shown that the insulting strips of Harkabi’s FLEX embodiment are a “short circuit protection device” as recited in claim 1. Specifically, Harkabi describes how the FLEX embodiment’s insulating strips act to prevent a short circuit from occurring: “In some USB connectors, shell 400 may serve as common electrical ground. In order to avoid short-circuiting the electrical contact points 403 not participating in the electrical mating, insulation strips 404 are lined inside shell 400.” Ex. 1011, 5:60–63. In other words, by preventing an unintentional contact, the insulating strips prevent a short circuit from occurring. *See id.*; *see also* Ex. 1002 ¶ 153. This comports with our construction of a “short circuit prevention device” as “any device that prevents a short circuit.” *See supra* Section II.C.2.

Patent Owner does not dispute this description of how Harkabi operates. Instead, Patent Owner relies on its proposed claim construction to argue that is not sufficient. *See* PO Resp. 8–12; PO Sur-Reply 8–9. However, we did not adopt Patent Owner’s proposed construction. Accordingly, Patent Owner’s argument is not commensurate with the scope of the claim. *Self*, 671 F.2d at 1348.

We have considered the entirety of the evidence submitted by the parties and determine that Petitioner has shown by a preponderance of the evidence that claim 1 of the '825 patent would have been obvious over Harkabi.

5. *Analysis of Claims 2, 4, and 8–10*

Claim 2 depends from claim 1 and recites that “the first and second set of contacts are supported on a planar substrate.” Ex. 1001, 17:25–26. Petitioner argues Harkabi teaches the additional limitation recited in claim 2. *See* Pet. 51. Specifically, Petitioner argues that “the FLEX embodiment teaches that the two sets of contacts are supported on a planar substrate, specifically the tongue 401.” *Id.* (citing Ex. 1011, 5:31–38).

Claim 4 depends from claim 1 and further recites that the connector is “USB-compatible or mini-USB compatible.” Ex. 1001, 17:31–32. Petitioner argues Harkabi teaches the additional limitation recited in claim 4. Pet. 51. Specifically, Petitioner argues that “the FLEX embodiment is designed to be USB-compatible.” *Id.* (citing Ex. 1011, 5:54–57).

Petitioner contends claim 8 depends from claim 1. *See* subsection D.3, *supra*. Claim 8 recites “[a] female connector adapted for accommodating the connector according to claim 1.” Ex. 1001, 17:40–41. Petitioner argues Harkabi teaches the additional limitation recited in claim 8. Pet. 51. Specifically, Petitioner argues that “a USB receptacle is the female connector that mates with the FLEX embodiment plug.” *Id.* (citing Ex. 1011, 5:54–57; Ex. 1002 ¶¶ 155–157).

Petitioner contends claim 9 depends from claim 1. *See* subsection D.3, *supra*. Claim 9 recites “[a] portable device comprising an electric circuit coupled to the connector according to claim 1.” Ex. 1001, 18:1–2.

Petitioner argues Harkabi teaches the additional limitation recited in claim 9. Pet. 52. Specifically, Petitioner argues that a person having ordinary skill in the art “would have combined the teachings of the SLIM embodiment used on a peripheral device with the FLEX embodiment by swapping the SLIM connector for the FLEX connector.” Pet. 52 (citing Ex. 1011, 6:4–21).

Petitioner further argues that a person having ordinary skill in the art would have made that modification “because the FLEX embodiment is an alternate USB connector” and “a connector by itself serves little to no purpose—one would have used the FLEX connector on a portable device with an electric circuit in order for it to be useful.” *Id.* (citing Ex. 1002 ¶ 158).

Claim 10 depends from claim 9 and recites “[t]he portable device according to claim 9, further comprising a power source.” Ex. 1001, 18:3–4. Petitioner argues Harkabi teaches the additional limitation recited in claim 9. Pet. 52. Specifically, Petitioner argues that Harkabi teaches “that the portable device has a power source.” *Id.* According to Petitioner, “Harkabi teaches that USB plugs may be used with peripherals such as printers, digital cameras, PDAs, and MP3 players and that its SLIM and FLEX embodiments are improved USB plugs.” *Id.* (citing Ex. 1011, 1:15–24, 3:8–10, 4:47–61). Petitioner further argues “[e]ach of those devices must have a power source in order to operate, whether the power be sourced directly from an electrical outlet or by an internal battery.” *Id.* (citing Ex. 1002 ¶ 159).

Patent Owner does not separately address the additional limitations recited in claims 2, 4, 8, 9, and 10. *See generally* PO Resp.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the

evidence that claims 2, 4, 8, 9, and 10 of the '825 patent would have been obvious over the teachings of Harkabi alone.

*E. Harkabi and EDN*

*1. Summary of EDN*

EDN is an article that discusses protecting electronic devices from the reverse installation of batteries. Ex. 1013, 165.<sup>22</sup> According to EDN, “[t]o make equipment resistant to the reverse installation of batteries,” the device must have either a mechanical means for preventing the reversal of a battery or “must ensure that any flow of reverse current is low enough to avoid damaging the circuit or the battery.” *Id.* EDN discusses various types of battery reversal protection, including using a diode. *Id.*

*2. Claim 5*

*a) Petitioner’s Arguments*

Claim 5 depends from claim 1 and recites that “said short circuit prevention device is a diode.” Ex. 1001, 17:33–34. Petitioner argues that EDN teaches the additional limitation recited in claim 5 and that a person having ordinary skill in the art would have combined EDN with Harkabi’s SLIM embodiment. Pet. 52–55. Specifically, Petitioner argues that “EDN explains that the ‘simplest’ way of preventing a short circuit is to use a diode.” *Id.* at 53 (citing Ex. 1013, 165). Petitioner further argues that a person having ordinary skill in the art would have understood “that a diode is a circuit element that blocks current from flowing in one direction, while allowing current to flow in the other direction” and “would adapt EDN’s diode solution to solve the short circuit problem in Harkabi because the problems are similar.” *Id.* (citing Ex. 1002 ¶¶ 162–164). According to

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<sup>22</sup> Citations to EDN are to the original pagination.

Petitioner, the person having ordinary skill in the art would modify Harkabi's SLIM embodiment by "plac[ing] a diode in series with each of the plug-side  $V_{BUS}$  contacts so that each diode blocks current that would otherwise flow to the metal shell of the USB receptacle . . . , [which would] prevent the plug contact touching the metal shell of the USB receptacle from completing a short circuit." *Id.* at 53–54 (citing Ex. 1002 ¶ 163).

Petitioner further argues that a person having ordinary skill in the art would have made the modification described above "because EDN teaches circuits of general applicability to protect against short circuits and other overcurrents in electronic devices." Pet. 54 (citing Ex. 1002 ¶ 164); *see also* Pet. Reply 15–16 (arguing EDN relates to short circuits and that a person having ordinary skill in the art "would have recognized that EDN was not applicable to a reverse current caused by a reversed battery installation only, but also to other short circuits and overcurrent conditions as well"); Ex. 1002 ¶¶ 162 (discussing how EDN's diode works), 163 (explaining that the issue in Harkabi is fundamentally the same as the one in EDN). Petitioner also argues that the person having ordinary skill in the art would have made the modification as either (1) protection in case the protective edges become worn and damaged or (2) to make the SLIM connector thinner by removing the protective edges while still providing short circuit prevention. Pet. 54–55 (citing Ex. 1002 ¶ 165). According to Petitioner, the modification involves using "a known technique to a known device ready for improvement to yield a predictable result." *Id.* at 54 (citing Ex. 1002 ¶ 164); *see also* Pet. Reply 20 (Dr. Baker testified that "using a diode for short circuit protection is very simple and very well-known. As a single element,

its use is taught to students when they are learning basic electronics.”  
(quoting Ex. 2003, 17:9–13)).

Petitioner also argues that Dr. Baker considered the potential disadvantages associated with adding a diode to Harkabi’s SLIM embodiment. *See* Pet. Reply 18–20. Specifically, Petitioner argues Dr. Baker simply did not discuss the cost and voltage drop in his testimony “because they were simple design choices.” *Id.* at 18 (citing Ex. 2003, 20:12–21:3). According to Petitioner, Dr. Baker testified that “diodes are fairly cheap so perhaps the cost increase isn’t a concern” and there would only be “a minor voltage drop.” *Id.* at 18–19 (quoting Ex. 2003, 17:20–18:3, 19:19–20:1). Petitioner further argues that such potential disadvantages do not render the claimed invention nonobvious. *Id.* at 18–20 (citing *In re Magna Elecs., Inc.*, 611 F. App’x 969, 973 (Fed. Cir. 2015); *Orthopedic Equip. Co v. United States*, 702 F.2d 1005, 1013 (Fed. Cir. 1983); *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 958 (Fed. Cir. 1997)).

*b) Patent Owner’s Arguments*<sup>23</sup>

Patent Owner argues that a person having ordinary skill in the art would not have added a diode to Harkabi’s SLIM embodiment due to “potential disadvantages” that Dr. Baker did not consider. PO Resp. 13–14 (citing Ex. 2003, 17:14–19). Specifically, Patent Owner argues adding a diode would entail an extra cost and cause a voltage drop. *Id.* at 14 (citing Ex. 2003, 17:20–18:9, 18:16–19:8). Patent Owner further argues that EDN

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<sup>23</sup> In addition to the arguments set forth below, Patent Owner argues Petitioner’s claim 5 theory cannot be used when evaluating claim 1 or the other dependent claims. PO Resp. 12. Because we only consider Petitioner’s theory regarding Harkabi and EDN with regard to claim 5, that argument is moot.

“cautions against the problem of voltage drop and suggests using a transistor instead.” PO Sur-reply 16 (citing Ex. 1013, 166<sup>24</sup>).

Patent Owner further argues Dr. Baker (1) had no explanation as to why Harkabi did not teach using a diode and (2) conceded that he could not find a single prior art reference that taught using a diode for a short circuit prevention device as part of a double sided USB connector. *Id.* at 14–17 (citing Ex. 2003, 16:3–17, 32:12–21, 33:7–34:25).

Patent Owner also argues Petitioner’s “theory relies on certain generic teachings in the EDN reference with respect to the use of a diode to prevent reverse current flow in a situation where a battery is connected the wrong way, i.e., such that the positive terminal and negative terminal are connected in reverse order.” PO Resp. 13 (emphasis omitted) (citing Pet. 52–55).

According to Patent Owner, however, EDN “does not show how to use diodes to prevent a short circuit.” PO Sur-Reply 13. Instead, Patent Owner argues EDN discusses “how to use diodes to address reverse current flow.” *Id.* (citing Ex. 1013, 165); *see also id.* at 13–15 (discussing EDN). Patent Owner further argues that Dr. Baker’s testimony drawing an analogy between short circuits and reverse current “offers no more insight than the fact that a diode restricts current flow to a single direction.” PO Sur-reply 15–16 (citations omitted).

*c) Our Analysis*

Patent Owner does not dispute that EDN teaches using a diode to prevent reverse current flow, which, as we explain below, is analogous to the short circuit problem Harkabi addresses.. *See generally* PO Resp. Based on the undisputed evidence before us and the reasons set forth in the Petition,

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<sup>24</sup> Patent Owner’s Sur-reply misidentifies the cited page as 66.

Pet. 52–55, we find that the combination of Harkabi’s SLIM embodiment and EDN teaches all of the limitations recited in claim 5.

A conclusion of unpatentability based on obviousness must be supported by “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), *cited with approval in KSR*, 550 U.S. at 418. The requirement for a reason to combine the references acts as a check on the potential for the improper use of hindsight. *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1343, 1354 (Fed. Cir. 2013) (holding that an articulated reasoning “is especially important to guard against the dangers of hindsight bias”).

Based on the entirety of the record, we find Petitioner has shown sufficiently articulated reasoning with rational underpinnings to support the legal conclusion of obviousness. As discussed below, Petitioner provides a detailed analysis of both Harkabi and EDN, and explains why, based on the teachings of these references, a person having ordinary skill in the art would have combined the references. *See* Pet. 52–55; Pet. Reply 15–20.

We find that Harkabi teaches using protective edges of the SLIM embodiment in order to “prevent physical connection to housing 100 that might otherwise cause a short circuit.” Ex. 1011, 5:23–30; *see also* Ex. 1002 ¶ 130. Dr. Baker testified that a person having ordinary skill in the art would have modified Harkabi’s SLIM embodiment to either (1) include an additional short circuit protection device in case the mechanical protective edges become worn or damaged or (2) replace the protective edges with a short circuit prevention device to make the male connector thinner. Ex. 1002 ¶ 165. Dr. Baker’s testimony on the reason to modify Harkabi’s SLIM embodiment is persuasive and stands un rebutted. Accordingly, we agree

with Petitioner and find that a person of ordinary skill in the art would have modified Harkabi's SLIM embodiment by either (1) adding a second short circuit protection device or (2) replacing the protective edges with a short circuit protection device that allows for a thinner male connector.

We have considered Patent Owner's arguments, as discussed below, and do not find them sufficiently persuasive to overcome Petitioner's showing.

We do not agree with Petitioner that EDN is directed to preventing short circuits. *See* Pet. Reply 15–16. The first sentence of EDN describes three different problems associated with battery operated equipment: “backward-installed batteries, accidental short circuits, and other careless use.” Ex. 1013, 165. However the remainder of EDN only discusses issues associated with backward installed batteries. *Id.* at 165–71. Thus, we agree with Patent Owner that “the reference to ‘short circuit’ is merely a passing note that short circuits can be a problem. It is not a teaching of how to solve the problem.” *See* PO Resp. 13.

However, we agree with Petitioner and find that the issue addressed by EDN is analogous to the short circuit problem Harkabi addresses. Specifically, EDN discusses the problem with incorrect current flow due to a battery being placed in the wrong orientation. Ex. 1013, 165. “If the battery were reversed, the positive battery terminal (current source) sends current into the end of the circuit designed to return current back to the battery (current source).” Ex. 1002 ¶ 162. EDN teaches that the simplest solution to that problem is placing a diode in series with the power supply, which allows current to flow when the battery is placed in the correct orientation

while blocking current flow when the battery is installed incorrectly.  
Ex. 1013, 165.

The incorrect flow of current due to battery reversal in EDN is fundamentally the same problem addressed by Harkabi. *See* Ex. 1002 ¶ 163. That is, the problem Harkabi addresses is how to prevent the improper flow of current when a contact of the male connector touches the metal shell: “If the SLIM connector is inserted into a USB receptacle, the unmated VCC contact touching the metal shell will incorrectly act as a current source (*i.e.*, letting the VCC current that the mated VCC contact receives flow directly to the metal shell and ground).” *Id.*; *see also* Ex. 1011, 5:23–30. Because Harkabi and EDN address analogous problems, we find that a person having ordinary skill in the art would have used EDN’s diode to prevent improper current flow with Harkabi’s SLIM embodiment. *See* Ex. 1002 ¶ 163 .

This conclusion is reinforced by the Examiner’s findings during the prosecution of the ’825 patent. The Examiner found using “a short circuit prevention device such as a diode with a switching unit to conduct electricity only when there is no short circuit” is “common knowledge, well known and widely used in the art of electrical connectors.” Ex. 2006, 22. “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416.

We further find Dr. Baker properly accounted for any potential disadvantages associated with Petitioner’s proposed modification. First, cost is not a consideration when determining whether an invention is obvious. “That a given combination would not be made by businessmen for economic reasons does not mean that persons skilled in the art would not make the

combination because of some technological incompatibility.” *In re Farrenkopf*, 713 F.2d 714, 718 (Fed. Cir. 1983); *see also Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1013 (Fed. Cir. 1983) (“[T]hat the two disclosed apparatus would not be combined by businessmen for economic reasons is not the same as saying that it could not be done because skilled persons in the art felt that there was some technological incompatibility that prevented their combinations.”); *Velandier v. Garner*, 348 F.3d 1359, 1368 (Fed. Cir. 2003) (“expense, time, and effort involved” are distinct from likelihood of success).

Moreover, even if cost were relevant, the only evidence in the record is that the cost of a diode is “fairly cheap” and “perhaps . . . isn’t a concern.” Ex. 2003, 17:20–18:3 (Baker Dep.). Such a minor increase in cost is not sufficient to persuade us that the proposed combination would not have been obvious.

Second, although Dr. Baker testified there would be a drop in voltage across the diode, he further testified the drop would be “negligible.” Ex. 2003, 18:4–9. When weighed against the advantages of the combination, a negligible drop in voltage is not enough to prevent a person having ordinary skill in the art from making the combination. *See Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (holding that “the benefits, both lost and gained, should be weighed against one another”).

We do not agree with Patent Owner that Dr. Baker did not consider these potential disadvantages when performing his analysis. To the contrary, Dr. Baker testified that he considered them, but did not include

them in his direct testimony because they were “pretty minor” and just a matter of a “design choice.” Ex. 2003, 18:16–21:3.

Additionally, we find Patent Owner’s arguments regarding Harkabi not discussing using a diode and the failure of Dr. Baker to find a single reference teaching using a diode for short circuit prevention as part of a double sided USB connector inapposite. Petitioner relies on obviousness, not anticipation. The lack of an anticipatory reference does not make a claim nonobvious. *See KSR*, 550 U.S. at 398 (holding a claim obvious where neither reference taught all of the claim limitations).

We have considered the entirety of the evidence submitted by the parties, and we determine that Petitioner has shown by a preponderance of the evidence that claim 5 of the ’825 patent would have been obvious over the combined teachings of Harkabi and EDN.

*F. Harkabi and Wiener*

*1. Summary of Wiener*

Wiener is an IEEE article that was presented at the WESCON/97 Conference held on November 6, 1997, and published in the WESCON/97 Conference Proceedings. Ex. 1014,<sup>25</sup> 442; Ex. 1024 ¶¶ 8–11 (Gernier Decl.). Wiener discusses PolySwitches, which are used to “provide circuit protection to prevent damage to equipment from short circuit faults” when used with IEEE1394 buses. Ex. 1014, 443. Wiener further describes how the PolySwitch conforms to USB requirements. *Id.*

The PolySwitch is a “resettable fuse[]” that “protects the circuit by going from a low-resistance to a high-resistance state in response to an overcurrent.” Ex. 1014, 443. “This change is the result of a rapid increase

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<sup>25</sup> Citations to Wiener are to the original pagination.

in the temperature of the device, caused by the generation of heat within the device by  $I^2R$  heating.” *Id.*

2. *Analysis of Claim 6*

Claim 6 depends from claim 1 and recites that the connector “further compris[es] a switching unit to conduct an electric current only if there is no electric short circuit between the anode and the cathode.” Ex. 1001, 17:35–37.

Petitioner argues Wiener teaches the additional limitation recited in claim 6. Pet. 55–58. Specifically, Petitioner argues Wiener’s “PolySwitch is a type of switch that ‘protects the circuit by going from a low-resistance to a high-resistance state in response to an overcurrent.’” Pet. 56 (quoting Ex. 1014, 443). Petitioner further argues that “the PolySwitch device is placed in series with the +5V Vcc contact of a USB port.” *Id.* (citing Ex. 1014, Fig. 5).

Petitioner further argues that a person having ordinary skill in the art would have added Wiener’s PolySwitch to each side of Harkabi’s SLIM embodiment in order to make the SLIM embodiment thinner. Pet 56–57 (citing Ex. 1002 ¶¶ 170–172, 174). Alternatively, a person having ordinary skill in the art would have made the modification to protect against wear and tear of the SLIM embodiment’s protective edges. *Id.* at 57–58 (citing Ex. 1002 ¶ 174). Petitioner further argues this is using “a known technique to improve a similar device in the same way” and that there was a reasonable expectation of success of making the combination. *Id.* at 57 (citing Ex. 1002 ¶ 173; Ex. 1014, 444, 447).

Patent Owner did not address Petitioner’s arguments directed to the combination of Harkabi and Wiener in the Patent Owner’s Response. *See*

*generally* PO Resp.<sup>26</sup> In its Sur-reply, however, Patent Owner argued that “Ground 4 [(Harkabi and Weiner)] relies entirely on Harkabi’s teachings for the ‘short circuit prevention device.’” PO Sur-reply 17–18. That is, according to Patent Owner, “[Petitioner] does not allege that Weiner teaches the ‘short circuit prevention device’ of claim 1.” *Id.* at 18.

Because we (1) do not adopt Patent Owner’s proposed construction of a “short circuit prevention device” and (2) determine that Harkabi—not Wiener—teaches the “short circuit prevention device” recited in claim 1, the parties’ arguments presented in Petitioner’s Reply and Patent Owner’s Sur-reply are moot.

Petitioner’s remaining arguments directed to the additional limitation recited in claim 6 and the reason to combine Harkabi and Wiener stand un rebutted. Based on the evidence and arguments presented in the Petition, we are persuaded by Petitioner’s analysis that Wiener teaches the additional limitation recited in claim 6 and, therefore, we determine that claim 6 would have been obvious over the combined teachings of Harkabi and Wiener.

*G. Harkabi and USB 2.0 Specification*

*1. USB 2.0 Specification*

USB 2.0 Specification is a publication by the USB Implementers Forum, the standards setting organization for USB. Ex. 1025 ¶¶ 1–3 (Ravencraft Decl.). Among other things, USB 2.0 Specification provides

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<sup>26</sup> Additionally, in Petitioner’s Reply and Patent Owner’s Sur-Reply, the parties address whether the combination of Harkabi and Wiener teaches a short circuit prevention device under Patent Owner’s proposed construction. *See* Pet. Reply 20–21; PO Sur-reply 17–18. Because we do not adopt Patent Owner’s proposed claim construction, those arguments are moot.

dimensions for the USB Series plugs. Ex. 1015, 119<sup>27</sup> (Fig. 6-4), 123 (Fig. 6-7). USB 2.0 Specification also provides that “[t]he host and all self-powered hubs must implement over-current protection . . . and the hub must have a way to detect the over-current condition and report it to the USB software.” *Id.* at 201 (§ 7.2.1.2.1). USB 2.0 Specification further provides that “[t]he over-current limiting mechanism must be resettable without user mechanical intervention” and that “Polymeric PTCs [(Positive Temperature Coefficient)] and solid-state switches are examples of methods, which can be used for over-current limiting.” *Id.*

## 2. *Analysis of Claims 3 and 6*

Claim 3 depends from claim 2 and recites that “the planar substrate is formed of a material that is sufficiently resilient to bend to a curvature radius of less than 50 cm without losing electrical or mechanical functionality.” Ex. 1001, 17:27–30.

Petitioner argues that the combination of Harkabi and USB 2.0 Specification teaches the additional limitation recited in claim 3. Pet. 58–61. Specifically, Petitioner argues, although Harkabi teaches that “the FLEX embodiment is ‘flexible’ so that it can mate properly with a USB receptacle,” “Harkabi does not disclose a measurement of the radius of curvature of the tongue 401 when it bends.” Pet. 58 (citing Ex. 1011, 5:31–33, Fig. 12c). According to Petitioner, a person having ordinary skill in the art would have realized that, when applying the dimensions of USB 2.0 Specification, the radius of curvature for Harkabi’s FLEX embodiment is

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<sup>27</sup> All references to the page number numbers in USB 2.0 Specification are to the page numbers in the middle, bottom portion of each page in Exhibit 1015.

about 2 cm. *Id.* at 58–60 (citing Ex. 1002 ¶¶ 176–184; Ex. 1015, Fig. 6-4, 6.7; Ex. 1011, 5:36–38). Therefore, according to Petitioner, a person having ordinary skill in the art would have understood that Harkabi’s FLEX embodiment, in view of the USB 2.0 Specification, renders claim 3 obvious. Pet. 61.

Claim 6 depends from claim 1 and recites that the connector “further compris[es] a switching unit to conduct an electric current only if there is no electric short circuit between the anode and the cathode.” Ex. 1001, 17:35–37.

Petitioner argues that the combination of Harkabi and USB 2.0 Specification teaches the additional limitation recited in claim 6. Pet. 61–62. Specifically, Petitioner argues that “USB 2.0 Specification requires that all USB hosts and self-powered hubs (e.g., a device with a USB plug) must implement over-current (i.e., short circuit) protection for safety reasons, and that the over-current limiting mechanism may be a solid-state switch.” Pet. 61 (citing Ex. 1015, 201 (§ 7.2.1.2.1); *see also* Ex. 1002 ¶¶ 185–188).

Petitioner also argues that a person having ordinary skill in the art “would have been motivated to combine the teachings of Harkabi with the USB 2.0 Specification in order to comply with USB 2.0 standard.” Pet. 62 (citing Ex. 1002 ¶¶ 185–88).

Patent Owner did not address Petitioner’s arguments directed to the combination of Harkabi and USB 2.0 Specification. *See generally* PO Resp.; PO Sur-Reply.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the

evidence that claim 3 and 6 would have been obvious over the combined teachings of Harkabi and USB 2.0 Specification.

#### *H. Harkabi and Hisano*

##### *1. Summary of Hisano*

Hisano is a United States published patent application titled “Exercise Aid Device and Exercise Aid Method Employing the Same.” Ex. 1016, code (54). Hisano is directed to “an exercise aid device which allows each individual to perform, safely and comfortably, an appropriate level of aerobic exercise without requiring the use of any special equipment, as well as an exercise aid method employing the same.” *Id.* ¶ 1. The system includes a fitness controller 100 and fitness headphone 200, which are connected by cable 300.<sup>28</sup> *Id.* ¶ 49, Fig. 1. The fitness headphone can be used to play music and store exercise data. *Id.* ¶¶ 51–53.

##### *2. Analysis of Claims 7 and 22*

Claim 7 depends from claim 1 and recites that the connector is “adapted for connection to an earphone.” Ex. 1001, 17:38–39. Petitioner argues that Hisano teaches the additional limitation recited in claim 7. Pet. 63–64. Specifically, Petitioner argues Hisano teaches a “headphone which connects by a USB cable.” *Id.* at 63 (citing Ex. 1016, Fig. 1).

Claim 22 depends from claim 9 and recites that the portable device “further comprising at least one transducer for capturing electro-physiological information.” Ex. 1001, 18:32–34. Petitioner argues that Hisano teaches the additional limitation recited in claim 22. Pet. 64.

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<sup>28</sup> Hisano Paragraph 49 misidentifies the cable as item 100. *Compare* Ex. 1016 Fig. 1 (identifying cable 300), *with id.* ¶ 49 (identifying both “fitness controller 100” and “cable 100”).

Specifically, Petitioner argues Hisano “teaches that its headphone contains sensors for detecting electrophysiological information such as pulse waves.” *Id.*; *see also* Ex. 1016 ¶¶ 52, 56.

Petitioner further argues that a person having ordinary skill in the art would have modified the plug used by Hisano’s headphones with either of Harkabi’s SLIM or FLEX plugs and that such a modification “would have been a simple substitution of one known element for another to obtain a predictable result (i.e., the headphone plug can now be inserted both ways).” Pet. 64 (citing Ex. 1002 ¶¶ 189–191); *see also id.* (citing Ex. 1002 ¶¶ 191–195).

Patent Owner did not address Petitioner’s arguments directed to the combination of Harkabi and Hisano. *See generally* PO Resp.; PO Sur-Reply.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 7 and 22 would have been obvious over the combined teachings of Harkabi and Hisano.

*I. Harkabi and Le*

*1. Le*

Le is a United States patent titled “Credit Card Sized Memory Card with Host Connector” and is directed “to removable storage media devices and, in particular, removable memory cards.” Ex. 1017, code (54), 1:6–7.

*2. Analysis of Claims 13–15 and 18*

Claim 13 depends from claim 9 and recites “having a planar substrate supporting the connector and supporting a magnetic stripe.” Ex. 1001, 18:11–14. Petitioner argues that Le teaches the additional limitation recited

in claim 13. Pet. 65–66. Specifically, Petitioner argues Le teaches a credit card shaped USB memory card with a magnetic stripe. *Id.* (citing Ex. 1017, 6:54–62, Figs. 2–7). Petitioner further argues Le teaches that “shieldless tab 16 may comprise a Universal Serial Bus (USB) compatible tab without an electrical shield. Electrical contacts 20 disposed on shieldless tab 16 maintain compatibility with the host connection standard regardless of the form of shieldless tab 16.” *Id.* (quoting Ex. 1017, 6:14–18).

Claim 14 depends from claim 9 and further requires the portable device “being formed of a material and being dimensioned to be compatible with a standard credit card.” Ex. 1001, 18:14–16. Petitioner argues that Le teaches the additional limitation recited in claim 14. Pet. 67. Specifically, Petitioner argues “Le teaches that its device has dimensions ‘substantially similar to a credit card’ and that it is made of plastic” and “that its credit card shaped ‘memory card 10 may be backward-compatible with conventional magnetic stripe readers often used for credit card and debit card financial transactions.’” *Id.* (quoting Ex. 1017, 5:24–31, 6:59–62) (citing Ex. 1017, 5:46–47).

Claim 15 depends from claim 9 and recites a portable device “further comprising electronic contacts to communicate with a smart card.” Ex. 1001, 18:17–18. Petitioner argues Le teaches the additional limitation recited in claim 15. Pet. 67–68. Specifically, Petitioner argues Le discloses a credit card shaped memory card with smart card contacts to communicate with a smart card reader. *Id.* (citing Ex. 1017, 5:9–23, Figs. 1A, 1B).

Claim 18 depends from claim 9 and recites “wherein the electronic circuit includes an authentication unit for authenticating the device.” Ex. 1001, 18:19–20. Petitioner argues Le teaches the additional limitation

recited in claim 18. Pet. 68–69. Specifically, Petitioner argues “Le teaches that it has an authentication unit (the secured memory that stores authentication keys) for authenticating the memory card during financial transactions.” *Id.* at 69; *see also id.* at 68–69 (citing Ex. 1017, 3:46–50, 4:52–58, 11:48–67).

According to Petitioner, because Le teaches using an altered, shieldless USB plug and Harkabi teaches a shieldless USB plug, a person having ordinary skill in the art would have combined the teaching of Le with Harkabi’s SLIM embodiment connector. Pet. 66 (citing Ex. 1002 ¶¶ 196–201), 67 (citing Ex. 1017, 6:14–18; Ex. 1002 ¶ 204), 68 (citing Ex. 1002 ¶¶ 205–207), 69. Additionally, Petitioner argues that, because “Harkabi expressly teaches that ‘security keys’ are a use case for USB devices,” a person having ordinary skill in the art would have “combine[d] Harkabi’s improved USB plug with Le to create a USB security key that is easier to insert.” *Id.* at 69 (citing Ex. 1011, 2:3–5; Ex. 1002 ¶¶ 208–210).

Patent Owner did not address Petitioner’s arguments directed to the combination of Harkabi and Le. *See generally* PO Resp.; PO Sur-Reply.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 13–15 and 18 would have been obvious over the combined teachings of Harkabi and Le.

*J. Harkabi and Benayoun*

*1. Summary of Benayoun*

Benayoun is a United States patent titled “Universal Serial Bus (USB) with Wireless Communication Hub” and is directed to “the transmission of data between a data processing System and input/output devices, and relates

in particular to a Universal Serial Bus (USB) with a wireless communication hub for transmitting data between a data processing system and input/output devices.” Ex. 1018, code (54), 1:7–12.

2. *Analysis of Claims 11 and 12*

Claim 11 depends from claim 9 and recites a portable device “further comprising a communication circuit for communicating with an external electronic device.” Ex. 1001, 18:5–7. Petitioner argues Benayoun teaches the additional limitation recited in claim 11. Pet. 69–71. Specifically, Petitioner argues “Benayoun discloses a USB wireless communication hub that enables communication with other devices.” *Id.* at 69 (citing Ex. 1018, 2:46–50); *see also id.* at 69–70 (citing Ex. 1018, 4:9–24, Fig. 2). That is, Petitioner argues “Benayoun teaches a portable device (the hub 10) that has a USB plug (the upstream port connected to the computer) and which has a communication circuit for communicating with an external electronic device (the wireless adapter).” *Id.* at 70.

Claim 12 depends from claim 9 and recites “wherein the communication circuit is adapted to enable access to the external electronic device.” Ex. 1001, 18:8–10. Petitioner argues Benayoun teaches the additional limitation recited in claim 12. Pet. 71. Specifically, Petitioner argues that “Benayoun teaches that the wireless hub [(USB communication circuit)] enables access to an external electronic device.” *Id.* (citing Ex. 1018, 2:46–54, 4:20–24, 5:7–9).

Petitioner also argues a person having ordinary skill in the art “would swap the USB plug used for the upstream port connected to the computer [in Benayoun] with either the SLIM or FLEX USB connectors described by Harkabi.” Pet. 70. Petitioner further argues that “such a modification would

have been a simple substitution of a known device for another to achieve a predictable result” and “would achieve the predictable result of making it easier to connect the hub to a computer.” *Id.* at 70–71 (citing Ex. 1002 ¶¶ 211–214).

Patent Owner did not address Petitioner’s arguments directed to the combination of Harkabi and Benayoun. *See generally* PO Resp.; PO Sur-Reply.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 11 and 12 would have been obvious over the combined teachings of Harkabi and Benayoun.

*K. Harkabi and Kim*

*1. Summary of Kim*

Kim is a United States published patent application titled “Computer and Driving Method Therefor.” Ex. 1020, code (54); *see also id.* ¶¶ 2–3 (field of the invention). The embodiment shown in Kim’s Figure 2 (not reproduced) has “a plurality of play/control buttons thereon for controlling the MP3 playback part 56, a liquid crystal display (LCD) screen 58 on which a list of the MP3 file is displayed, and a sound output port.” *Id.* ¶ 31.

*2. Analysis of Claims 16, 17, 23, and 24*

Claim 16 depends from claim 9 and recites “further comprising a display device for displaying visual information.” Ex. 1001, 18:19–20. Petitioner argues Kim teaches the additional limitation recited in claim 16. Pet. 72. Specifically, Petitioner argues Kim has an LCD screen that displays a list of MP3 files. *Id.* (citing Ex. 1020 ¶ 31).

Claim 17 depends from claim 9 and recites “further comprising an audio play unit for playing audio information.” Ex. 1001, 18:21–22. Petitioner argues Kim teaches the additional limitation recited in claim 17. Pet. 73. Specifically, Petitioner argues that “Kim discloses that its device has an MP3 playback part so that it can play music.” Pet. 73 (citing Ex. 1020 ¶¶ 30–33, 41, 42).

Claim 23 depends from claim 9 and recites “further including a user interface for receiving user input.” Ex. 1001, 18:36–37. Petitioner argues Kim teaches the additional limitation recited in claim 23. Pet. 73. Specifically, Petitioner argues Kim teaches a user interface that receives a user’s input to control the MP3 player. *Id.* (citing Ex. 1020 ¶ 33).

Claim 24 depends from claim 9 and recites “wherein the electronic circuit includes a flash memory.” Ex. 1001, 18:38–39. Petitioner argues Kim teaches the additional limitation recited in claim 24. Pet. 74. Specifically, Petitioner argues that Kim’s MP3 player uses a flash memory to store MP3 files. *Id.* (citing Ex. 1020 ¶¶ 15, 30, 32).

Petitioner further argues that a person having ordinary skill in the art would “replace the standard USB plug on Kim’s device with either the SLIM or the FLEX embodiments of Harkabi.” Pet. 72. According to Petitioner, this “would predictably make it easier for the end user to plug the device into a computer” and “would have been a simple substitution of one known element for another to obtain a predictable result.” *Id.* (citing Ex. 1002 ¶¶ 220–222).

Patent Owner did not address Petitioner’s arguments directed to the combination of Harkabi and Kim. *See generally* PO Resp.; PO Sur-Reply.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 16, 17, 23, and 24 would have been obvious over the combined teachings of Harkabi and Kim.

*L. Harkabi and Funahashi*

*1. Summary of Funahashi*

Funahashi is a United States published patent application titled “Fingerprint Identification System, Fingerprint Identification Apparatus, Fingerprint Identification Method, and Biometric Identification Apparatus.” Ex. 1019, code (54); *see also id.* ¶ 2.

*2. Analysis of Claim 19*

Claim 19 depends from claim 9 and recites “further comprising a biometric sensor.” Ex. 1001, 18:26–27. Petitioner argues Funahashi teaches the additional limitation recited in claim 19. Pet. 74. Specifically, Petitioner argues Funahashi teaches a fingerprint reader or biometric sensor, which is connected to a computer via a USB plug. *Id.* (citing Ex. 1019 ¶¶ 2, 33, 34, 65, 69, 72, 76, 77, 101).

Petitioner further argues that a person having ordinary skill in the art would have modified Funahashi’s device by “swap[ping] the USB plug used in Funahashi with Harkabi’s double-sided USB plug (either of the SLIM or FLEX embodiments),” and that such a substitution would have been one “of one known element for another to obtain the predictable result of an improved USB plug that makes it easier to plug the device into a computer.” Pet. 74–75 (citing Ex. 1002 ¶¶ 235–238).

Patent Owner did not address Petitioner's arguments directed to the combination of Harkabi and Funahashi. *See generally* PO Resp.; PO Sur-Reply.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 19 would have been obvious over the combined teachings of Harkabi and Funahashi.

*M. Harkabi and Poo*

*1. Summary of Poo*

Poo is a United States published patent application titled “Portable Data Storage and Image Recording Device Capable of Direct Connection to a Computer USB Port” and is directed “to a portable storage device, and in particular to a portable storage device having image and/or audio capture capabilities.” Ex. 1021, code (54), ¶ 7.

*2. Analysis of Claims 20 and 21*

Claim 20 depends from claim 9 and recites “further comprising an imaging device for capturing visual information.” Ex. 1001, 18:28–29. Petitioner argues Poo teaches the additional limitation recited in claim 20. Pet. 75. Specifically, Petitioner argues Poo teaches a camera that can be connected to a computer via a USB connector. *Id.* (citing Ex. 1021 ¶ 41, Fig. 2).

Claim 21 depends from claim 9 and recites “further comprising a transducer for capturing audio information.” Ex. 1001, 18:30–31. Petitioner argues Poo teaches the additional limitation recited in claim 21. Pet. 76. Specifically, Petitioner argues Poo teaches “an acoustic digitizer circuit . . .

for digitizing sound recorded by a microphone.” *Id.* (quoting Ex. 1021 ¶ 32).

Petitioner further argues that a person having ordinary skill in the art “would replace the USB plug on [Poo’s] camera with either of the SLIM or FLEX embodiment USB plugs described in Harkabi.” Pet. 76. According to Petitioner, the modification “would lead to the predictable result of the cameras being easier to plug into the computer” and “would have been a simple substitution of one known element for another to obtain a predictable result.” *Id.* at 75–76 (citing Ex. 1002 ¶¶ 239–242).

Patent Owner did not address Petitioner’s arguments directed to the combination of Harkabi and Poo. *See generally* PO Resp.; PO Sur-Reply.

Based on the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 20 and 21 would have been obvious over the combined teachings of Harkabi and Poo.

*N. Summary of Claims Challenged in the Petition*

For the reasons discussed above, Petitioner has proven by a preponderance of the evidence that claims 1, 2, 4, 8, and 9 are unpatentable as anticipated by Harkabi and that claims 1–24 are unpatentable as obvious over either Harkabi alone or Harkabi in combination with an additional prior art reference.

*O. Patent Owner’s Contingent Motion to Amend*

We have concluded that Petitioner has proven by a preponderance of the evidence that claims 1–24 of the ’825 patent are unpatentable. Therefore, we address Patent Owner’s Contingent Motion to Amend in which it seeks to replace claims 1–24 with proposed substitute claims 25–48.

*See generally* Mot. Amend. For the reasons that follow, Patent Owner’s motion is *denied*.

*1. Legal Standard for a Motion to Amend*

In reviewing a motion to amend, we first consider whether the motion meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 and IPR2018-01130, Paper 14 (PTAB Feb. 25, 2019) (designated precedential). Under those requirements, Patent Owner must demonstrate the following: (1) the amendment responds to a ground of unpatentability involved in the trial; (2) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter; (3) the amendment proposes a reasonable number of substitute claims; and (4) the proposed claims are supported in the original disclosure of the patent. *See* 35 U.S.C. § 316(d) (2012); 37 C.F.R. § 42.121; *Lectrosonics*, Paper 15 at 4–8.

We also consider patentability. In that regard, Patent Owner “does not bear the burden of persuasion to demonstrate the patentability of [the proposed] substitute claims.” *Lectrosonics*, Paper 15 at 4 (*citing Aqua Prods. v Matal*, 872 F.3d 1290 (Fed. Cir. 2017) (en banc); *Bosch Auto. Serv. Sols. LLC v. Matal*, 878 F.3d 1027 (Fed. Cir. 2017)). “Rather, as a result of the current state of the law and [U.S. Patent and Trademark Office] rules and guidance, the burden of persuasion ordinarily will lie with the petitioner to show that any proposed substitute claims are unpatentable by a preponderance of the evidence.” *Lectrosonics*, Paper 15 at 4.

For purposes of this Decision, we address only those issues that are case dispositive: whether Patent Owner meets the statutory and regulatory

requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121, whether Petitioner has shown by a preponderance of the evidence that proposed substitute claims 25–27, 29, 30, and 32–48 are indefinite, and whether Petitioner has shown by a preponderance of the evidence that proposed substitute claims 28 and 30 are not enabled.

## *2. Proposed Substitute Claims*

Patent Owner has proposed replacing claims 1–24 with proposed substitute claims 25–48. Patent Owner identifies proposed substitute claims 25–28 and 31 as independent claims. Mot. Amend 2. Claims 25, 28 and 31, reproduced below, replace original claims 1, 4, and 7, respectively, and they are illustrative of the subject matter of the proposed substitute claims (with underlining indicating language added and strikethrough indicating language removed).

25. (Substitute for claim 1, if found unpatentable) A multi-contact connector supporting on opposite surfaces first and second sets of mutually opposed contacts wherein corresponding contacts in each set are electrically interconnected and are spatially aligned in a mutually opposed relationship allowing the multi-contact connector to be connected in two opposed orientations directly to a corresponding ~~FCCS~~USB-compatible receptacle supporting on an internal surface thereof a multi-contact data connector having only a single set of contacts that is compatible to either one of said first and second sets of mutually opposed contacts such that identical functionality is obtained regardless of the orientation of the multi-contact connector within the receptacle, said multi-contact connector further comprising an electronic short circuit prevention device to prevent an electric short circuit between contacts of the receptacle on inserting the multi-contact connector therein, wherein:

the opposite surfaces supporting the first and second sets of mutually opposed contacts have a length of less than 6 mm,

width greater than 3 mm and distance between the opposite surfaces of less than 1.1 mm but more than 0.3 mm,

the receptacle comprises internal metallic resilient leaves,  
and

the electronic short circuit prevention device is operable to prevent a short circuit between VBUS and GND contacts,

28. (Substitute for claim 4, if found unpatentable) A multi-contact connector supporting on opposite surfaces first and second sets of mutually opposed contacts wherein corresponding contacts in each set are electrically interconnected and are spatially aligned in a mutually opposed relationship allowing the multicontact connector to be connected in two opposed orientations directly to a corresponding USB-compatible receptacle supporting on an internal surface thereof a multi-contact data connector having only a single set of contacts that is compatible to either one of said first and second sets of mutually opposed contacts such that identical functionality is obtained regardless of the orientation of the multi-contact connector within the receptacle, said multi-contact connector further comprising an electronic short circuit prevention device to prevent an electric short circuit between contacts of the receptacle on inserting the multi-contact connector therein, the connector according to claim 1, being USB-compatible or mini-USB compatible, wherein:

the opposite surfaces supporting the first and second sets of mutually opposed contacts have a length of less than 6 mm, width greater than 3 mm and distance between the opposite surfaces of less than 1.1 mm but more than 0.3 mm,

the first and second sets of contacts are supported on a rigid planar substrate and,

the multi-contact connector being able to mate electrically with one of USB 1.0 or USB 2.0 sockets, the multi-contact connector further not having mechanical characteristics of any of male USB plugs of Type A, Type B, Mini A or Mini B.

31. (Substitute for claim 7, if found unpatentable) A multi-contact connector supporting on opposite surfaces first and

second sets of mutually opposed contacts wherein corresponding contacts in each set are electrically interconnected and are spatially aligned in a mutually opposed relationship allowing the multicontact connector to be connected in two opposed orientations directly to a corresponding USB-compatible receptacle supporting on an internal surface thereof a multi-contact data connector having only a single set of contacts that is compatible to either one of said first and second sets of mutually opposed contacts such that identical functionality is obtained regardless of the orientation of the multi-contact connector within the receptacle, said multi-contact connector further comprising an electronic short circuit prevention device to prevent an electric short circuit between contacts of the receptacle on inserting the multi-contact connector therein, The multi-contact connector according to claim 1, being adapted for connection to an earphone equipped with a compatible USB connector, wherein:

the receptacle comprises internal metallic resilient leaves,

the multi-contact connector is operable to supply power to the receptacle and to receive power from the receptacle and,

the multi-contact connector is integrated into to a portable device which does not include an audio jack socket.

Mot. Amend 26–27, 29–30, 31–32.

### *3. Procedural Requirements*

“Before considering the patentability of any substitute claims, . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.” *Lectrosonics*, Paper 15 at 4.

First, we consider whether the Motion to Amend proposes a reasonable number of substitute claims. 35 U.S.C. § 316(d)(1)(B). “There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.” *Lectrosonics*, Paper 15 at 4–5

(citing 37 C.F.R. § 42.121(a)(3)). The Petition challenges 24 claims. The Motion to Amend proposes 24 substitute claims. Mot. Amend 5, 26–35. Because there is only a single proposed substitute claim for each challenged claim, the number of proposed claims is reasonable.

Second, we consider whether the proposed substitute claims respond to a ground of unpatentability involved in this trial. *Lectrosonics*, Paper 15 at 5–6. Patent Owner argues that the Motion to Amend proposes adding limitations to the independent claims that are “directed toward overcoming Petitioners’ allegations with respect to Harkabi.” Mot. Amend 5. Specifically, Patent Owner proposes amending each of the claims to add the word “electronic” so that the “short circuit protection device” is now an “*electronic* short circuit protection device. *See id.* at 2–3, 26–35. Patent Owner asserts that the proposed substitute claims are patentable over the references at issue in this proceeding. *Id.* at 20–25.

Petitioner argues that adding the word “electronic” does not respond to the prior art raised in Ground 3 and 4. Opp. Amend 14–15; Sur-reply Amend 5. Petitioner further argues that some of the amendments eliminate features found in dependent claims and that most of the other amendments “do not meaningfully respond to the prior art grounds in the Petition.” Opp. Amend. 13–15; Sur-Reply Amend 4–5.

Based on the record as a whole, we are persuaded that the proposed amendments respond to at least one ground of patentability. First, there is no dispute that the “*electronic* short circuit protection device” was responsive to Grounds 1 and 2 in the Petition. Second, to the extent Petitioner argues that the proposed amended claims are unpatentable, the arguments depend, in part, on Chou, a reference that was not used in the

Petition. Petitioner's reliance on an additional reference is an implicit acknowledgement that the claims were amended to overcome the prior art asserted in the Petition and, thus, the proposed amendments respond to a ground of unpatentability involved in the trial.

Third, we consider the breadth of the substitute claims. "A motion to amend may not present substitute claims that enlarge the scope of the challenged patent or introduce new subject matter." *Lectrosonics*, Paper 15 at 6–8 (citing 35 U.S.C. § 316(d)(3); 37 C.F.R. § 41.121(a)(2)(ii)).

Patent Owner asserts that proposed substitute claims 25–48 are supported by the original disclosure of the '870 application. *See* Mot. Amend 6–19.

Petitioner argues that proposed amended claims 26, 29, 31, and 34 lack original description support for the limitation requiring that "the multi-contact connector is operable to supply power to the receptacle and to receive power from the receptacle." Opp. Amend 3–6; Sur-reply Amend 5–7. We address that argument in detail below and, for the reasons discussed in section O.4.(b), we are persuaded that claims 26, 29, 31, and 34 are not supported by the original '870 Application.

Petitioner further argues that claims 36, 37, 39, 41, and 48 are not supported by the '870 application because the claims combine multiple embodiments. *See* Opp. Amend 6–10; Sur-reply Amend 7–8. We are not persuaded by Petitioner's arguments. Based on the written description of the '870 application, the various figures relied on by Patent Owner are not separate embodiments but different aspects of the same embodiment. *See* Reply Amend 10–11. Accordingly, we agree with Patent Owner that

proposed substitute claims 24, 25, 27, 28, 30, 32, 33, and 35–48 do not enlarge the scope of the claims or introduce new subject matter.

Finally, the Motion to Amend includes a claim listing, as required by 37 C.F.R. § 42.121(b). Mot. Amend 26–35; *Lectrosonics*, Paper 15 at 8.

In view of the above, we determine that, with respect to proposed substitute claims 25, 27, 28, 30, 32, 33, and 35–48, Patent Owner’s Motion to Amend meets the statutory and regulatory requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121 in a manner sufficient to proceed with the issue of whether Petitioner has met its burden of persuasion with respect to patentability. However, for the reasons discussed in the following section, proposed substitute claims 26, 29, 31, and 34 do not meet the statutory and regulatory requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.

4. *Support for the Proposed Substitute Claims 26, 29, 31, and 34 in the Original Disclosure*

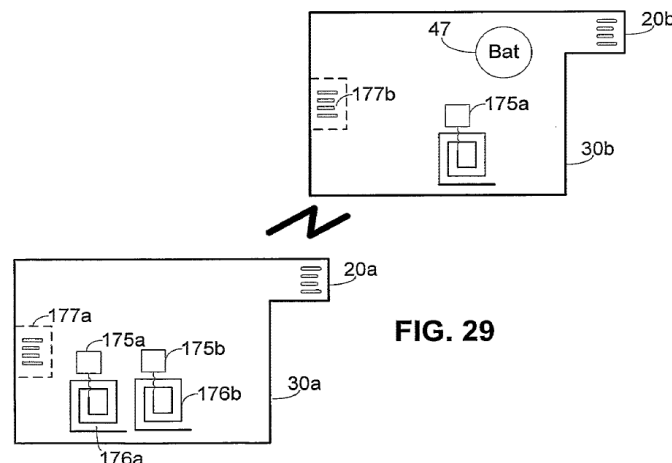
A motion to amend must set forth “support in the original disclosure of the patent for each claim that is added or amended.” 37 C.F.R. § 42.121(b)(1). Stated differently, there must be written description support for the proposed substitute claims. The test for determining compliance with the written description requirement is whether the disclosure of the application as originally filed reasonably conveys to a person of ordinary skill in the art that the inventor had possession at that time of filing of the claimed subject matter, rather than the presence or absence of literal support in the specification for the claim language. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1562–63 (Fed. Cir. 1991); *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983). Although “[s]uch description need not recite the claimed invention *in haec verba*,” the description “must do more than

merely disclose that which would render the claimed invention obvious.”  
*ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377 (Fed. Cir. 2009) (citing *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 920, 923 (Fed. Cir. 2004); *see also Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566–67 (Fed.Cir.1997)); *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997).

*a) The Parties’ Arguments*

Claim 31 recites, *inter alia*, that “the multi-contact connector is operable to supply power to the receptacle and to receive power from the receptacle.” Mot. Amend 31. Claims 26, 29, and 34 recite substantially the same limitation. *See id.* at 26–27, 30, 32.

Patent Owner argues that the ’870 application provides written description support for that limitation. Mot. Amend 11–12 (citing Ex. 2005 (the ’870 application), 5:21–22, 24:10–15, Abst.; Ex. 2004 ¶ 59); *see also id.* at 14, 15, 16. Specifically, Patent Owner argues that the embodiment of Figure 29 of the ’870 application provides written description support for this limitation. Reply Amend 7–8; *see also* Tr. 54:16–58:10 (discussing how the Figure 29 embodiment provides written description support). Figure 29 of the ’870 application is reproduced below.



Ex. 2005, Fig. 29. Figure 29 of the '870 application “is a plan view of two devices with the ability to communicate with one another.” *Id.* at 7:26–27; *see also id.* at 24:1–23 (discussing the Figure 29 embodiment).

In addition to the Figure 29 embodiment, Patent Owner also argues original claims 15 and 69 provide written description support. Reply Amend 8 (citing Ex. 2005, 27:9–11, 31:19–21; Ex. 2007 ¶ 28).

Petitioner argues that the portions of the application cited by Patent Owner “fail to disclose a connector that can supply *and* receive power to and from a receptacle.” Opp. Amend 3. Specifically, Petitioner argues Figure 29 shows a receptacle of one device (device 30b, receptacle 177b) supplying power to a second device (device 30a, connector 20a). *Id.* at 3–4 (citing Ex. 2005, 21:1–7, 24:10–15). According to Petitioner, the '870 application “does not show or explain supplying power *from* connector 20a to the receptacle 177b.” *Id.* at 4 (citing Ex. 1035 ¶¶ 41–42, 44–45). Petitioner also argues that other portions of the '870 application similarly only disclose power going in one direction. *Id.* at 4–5 (citing Ex. 2005, 5:21–24; Ex. 1035 ¶¶ 43, 46–47, 52, 53).

Petitioner further argues that Patent Owner’s expert testified that the '825 patent is “agnostic as to which way the power is going.” Opp. Amend 4 (quoting Ex. 1034, 202:19–203:1) (citing Ex. 1034, 203:2–204:5). Petitioner argues that an “agnostic” disclosure “is insufficient to establish that the connector in fact supplies and receives power to and from the receptacle.” *Id.* (citing *TurboCare Div. of Demag Delaval Turbomachinery Corp. v. Gen. Elec. Co.*, 264 F.3d 1111, 1119 (Fed. Cir. 2001)). Petitioner also argues that Dr. Fernald’s declaration regarding the Figure 29

embodiment contradicts his previous testimony. Sur-reply Amend 5 (citing Ex. 1034, 202:14–17, 202:20–203:1).

Petitioner further argues that Patent Owner’s argument regarding the Figure 29 embodiment is logically flawed, because if device 30a does not have a battery, then it cannot be used to recharge device 30b’s battery. *Id.* at 5–6.

Petitioner further argues original claims 15 and 69 do not provide written description support. Sur-reply Amend 6. Specifically, Petitioner argues that “those claims recite a connector that supplies power only, not a connector that supplies **and** receives power.” *Id.*

Petitioner also argues that “[t]he USB Specification also specifically **prohibits** a connector from supplying current at the ‘upstream’ facing port.” Opp. Amend 5 (citing Ex. 1015, 199 (§ 7.2.1)). According to Petitioner, “a plug that complies with USB standard and connects to a host USB receptacle **cannot** supply power to the receptacle.” *Id.* (citing Ex. 1035 ¶¶ 48–50). Petitioner further argues that, because claims 26, 29, 31, and 34 recite “the multi-connector to be connected . . . directly to a corresponding USB-compatible receptacle,” the connectors must comply with the USB standard at the time of the invention, which “prohibited a connector from supplying and receiving power with a USB receptacle.” Sur-reply Amend 6 (citing Ex. 1035 ¶¶ 48–50).

Petitioner further argues that a person having ordinary skill in the art “would have understood that the limitation of supplying and receiving power is incompatible with the two disclosed methods of preventing a short circuit in the ’825 Patent and the ’870 Application.” Opp. Amend 5. Specifically, Petitioner argues, because a diode and relay only allow current to flow in

one direction, a person having ordinary skill in the art “would have understood that the connectors at best could only supply *or* receive power, but *not both*.” *Id.* at 5–6 (citing Ex. 1035 ¶¶ 51, 54–56; Ex. 2005, 9:26–10:17; Ex. 1034, 80:1–5). According to Petitioner, for example, “[t]he specification describes that the relay unit “transfers only forward current from the VBUS contacts.” Sur-reply Amend 6 (citing Ex. 2005, 10:14–15).

In response, Patent Owner argues that USB Specification 2.0 is irrelevant. Reply Amend 8. According to Patent Owner, “[n]othing in the claims requires the connector to comply with every aspect of the USB standard.” *Id.*

With regards to Petitioner’s arguments regarding the diode and relay, Patent Owner argues that a person having ordinary skill in the art would have understood “that a relay unit can allow current to flow in both directions.” Reply Amend 8–9. According to Patent Owner, a person having ordinary skill in the art would not have understood that “the description of the power coming from the VBUS contacts in one scenario as indicating that the relay unit could not allow power to flow in the other direction as well.” *Id.* at 9. Patent Owner also argues that Petitioner’s argument cannot negate “the explicit disclosures of the connector supplying and receiving power.” *Id.* (citing Ex. 2007 ¶ 31).

*b) Our Analysis*

For the reasons set forth below, Patent Owner has not shown that the ’870 application provides sufficient written description support for “the multi-contact connector is operable to supply power to the receptacle and to receive power from the receptacle,” recited in claim 31.

Patent Owner relies on three portions of the '870 application for written description support. *See* Mot. Amend 11–12 (citing Ex. 2005, 5:21–22, 24:10–15, Abst.; Ex. 2004 ¶ 59). The cited portions of the '870 application are reproduced below:

The device can have rechargeable power source that is fed power via the connector's power lines. . . .

. . .

Preferably, the device operates from power supplied via the  $V_{\text{BUS}}$  and GND contacts of the FCCS receptacle connector.

. . .

. . . The device 30a can be connected to device 30b by plugging the connector 20a into the USB compliant receptacle 177b, thereby permitting:

- a) Transfer of files between both devices;
- b) Transfer of the entire content of one device to the other device
- c) Recharging the other device
- d) Supply of power to the other device . . . .

Ex. 2005, Abst., 5:21–22, 24:10–15. Although each of the cited sections discusses supplying power, the sections only discuss supplying power in a single direction. *See id.*; *see also* Ex. 1035 ¶¶ 41–45. For example, the Abstract and page 5 citations simply recite that power is being supplied from the connector to the receptacle. Ex. 2005, Abst., 5:21–22; Ex. 1035 ¶ 43. However, neither section suggests that a connector can both supply and receive power. *See* Ex. 2005, Abst., 5:21–22; Ex. 1035 ¶ 43.

Similarly, the Figure 29 embodiment described on page 24 states how one device can be used for “[r]echarging the other device” and “[s]upply of power to the other device.” Ex. 2005, 24:10–15. However, that section

merely describes supplying power from one device to the other device; there is no description of sending power back from the other device to the original device. *Id.*; *see also* Ex. 1035 ¶¶ 44–45.

The language describing recharging and supplying power stands in stark contrast to the language used to describe file transfers. Specifically, the '870 application states that the connected device permits the “[t]ransfer of files *between both devices*.” Ex. 2005, 24:10–12 (emphasis added). The phrase “between both devices” makes it clear that the data flow goes in both direction. However, the '870 application only discusses the flow of power to “the other device” and not “between both devices.” *Compare id.* at 24:12, *with id.* at 24:14–15.

We are also not persuaded by Dr. Fernald’s declaration testimony that connectors 20a of the Figure 29 embodiment “both suppl[y] and receive[] power.” *See* Ex. 2007 ¶ 26. First, his testimony is inconsistent with the actual words used in the disclosure of the '870 application. Dr. Fernald describes a scenario in which a first device (30b) is recharged through connector 20b and that the second device (30a) is supplied power through connector 20b. *Id.* However, Dr. Fernald does not address the application’s explicit disclosure that the connector is both “recharging” and “supplying” power to the “other device.” Ex. 2005, 24:10–15. That is, the connector is used to recharge and supply power to the same device. *See id.* Contrary to Dr. Fernald’s testimony, the '870 application does not describe supplying power between the devices.

Second, Dr. Fernald’s description of how connector 20b operates is inconsistent with the USB 2.0 Specification, which was the relevant USB specification at the time the '870 application was filed. Both proposed

substitute claim 26 and the description of the Figure 29 embodiment require the receptacle to be USB compliant. *See* Mot. Amend 27–28; Ex. 2005, 24:1–7. At the relevant time, USB compliant devices—that is devices that complied with the then-current USB Specification—only allowed power to flow in a single direction. *See* Ex. 1015, 199 (§ 7.2.1); Ex. 1035 ¶¶ 48–50. Because Dr. Fernald does not explain how a receptacle can be both USB compliant, while at the same time being configured to both supply and receive power, his testimony is not credible.

Third, Dr. Fernald’s declaration testimony is not consistent with his deposition testimony. During his deposition, Dr. Fernald testified that the description of the Figure 29 embodiment is “agnostic as to which way the power is going.” Ex. 1034, 202:7–203:1. However, being agnostic as to the direction that power flows is not the same as teaching a receptacle that can both supply and receive power. The ’870 application cannot be both agnostic as to the direction power flows and, at the same time, disclose a connector that can both receive and supply power.

In the Reply, Patent Owner relies on an additional portion of the specification—original claims 15 and 69. Even if reliance on a new portion of the specification was timely, it is similarly unpersuasive. Those claims recite “wherein the power source is adapted to supply power supply to another electronic device connected to the connector of the portable device.” Ex. 2005, 27, 31. As with the other citations to the ’870 application, those claims simply discuss power flowing in one direction.

In our view, *Turbocare* is instructive. In *Turbocare*, the district court granted summary judgment that the patent lacked written description support for the location of the springs in claim 2. The Federal Circuit found that the

original patent application was “completely lacking in any description of an embodiment in which the spring is located between the casing shoulders and the inner surface of the outer ring portion of the ring segment” as recited in claim 2. *Turbocare*, 264 F.3d at 1119. The Federal Circuit further found that, although “[s]uch an embodiment may have been obvious from [the original disclosure’s] vague reference to a ‘spring located . . . adjacent to said rings,’ . . . that is not enough to satisfy the written description requirement.” *Id.* (citation omitted).

Similarly, in this case, the ’870 application does not have an embodiment in which “the multi-contact connector is operable to supply power to the receptacle and to receive power from the receptacle” as recited in proposed substitute claim 31. Although such a connector may have been obvious, that is not enough to provide written description support.

For the reasons set forth above, we determine the ’870 application does not provide written description support for “the multi-contact connector is operable to supply power to the receptacle and to receive power from the receptacle” recited in proposed substitute claim 31. Accordingly, we deny the Motion to Amend for claim 31 for this reason. Additionally, for the same reasons, we deny the Motion to Amend for claims 26 and 29, which recite the same limitation, and claim 34, which recites substantially the same limitation.

## 5. *Indefiniteness*

### a) *Legal Standard*

A claim may be indefinite if it is “ambiguous, vague, incoherent, opaque, or otherwise unclear in describing and defining the claimed invention” and the applicant “fails to provide a satisfactory response.” *In re*

*Packard*, 751 F.3d 1307, 1311 (Fed. Cir. 2014). The Supreme Court has instructed that “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). “The claims, when read in light of the specification and the prosecution history, must provide objective boundaries for those of skill in the art.” *Interval Licensing, LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014).

*b) Claims 25 29, 30, and 32–48*

*(1) The Parties’ Arguments*

Petitioner argues that the last limitation recited in proposed substitute claim 25—namely, “operable to prevent a short circuit between VBUS and GND contacts”—is indefinite because it lacks an antecedent basis and is amenable to multiple interpretations. *See* Opp. Amend 1–2; Sur-reply Amend 1–2. According to Petitioner, “VBUS and GND contacts” can refer to the contacts on the receptacle, the VBUS contact of the connector and the GND of the receptacle, or some other combination of contacts. Opp. Amend 1.

Petitioner further argues that the Specification is unhelpful in determining the meaning of the VBUS and GND contacts as it describes both (1) the receptacle and (2) each side of the connector as having VBUS and GND contacts. Opp. Amend 2. According to Petitioner, “[t]hus, reciting ‘between VBUS and GND contacts’ does not identify a particular set of contacts.” *Id.*; *see also* Tr. 20:11–26 (“The problem with this additional limitation is that there are three VBUS and ground contacts and

three ground contacts in the combination of the reversible connector and the receptacle itself. . . . And so the indefiniteness issue boils down to, it's not clear which of the claimed contacts are being recited in the limitation VBUS and ground contacts in the final claim limitation.”).

Patent Owner responds that proposed substitute claim 25 provides an antecedent basis:

[E]ach of the substitute claims recites “an electronic short circuit prevention device to prevent an electric short circuit between contacts of the receptacle.” Thus, a [person having ordinary skill in the art] would understand that the limitation “wherein . . . the electronic short circuit prevention device is operable to prevent a short circuit between VBUS and GND contacts” is referring to the antecedent “contacts of the receptacle.” Ex. 2007 ¶ 14. It is stated with utmost clarity in the claims themselves that the short circuit prevention device fills that role.

Reply Amend 2.

Patent Owner further argues that the '870 application and the priority documents make it clear that the claims are referring to the contacts of the receptacle:

The '870 Application states that the receptacle's “resilient leaves . . . are usually metallic and coupled to GND” and that the short circuit prevention device prevents a short circuit between the leaves and the receptacle's VBUS contact, which would otherwise occur via the connector. Ex. 2005 at 3:19–22, 10:13–17; Ex. 2007 at 17. Thus, priority documents make clear that the short circuit prevention device prevents the short circuit that would occur between the receptacle's VBUS and GND contacts *via the VBUS contacts of the connector and leaves of the receptacle. Id.*

Reply Amend 3; *see also* Tr. 51:5–10 (“The claims themselves say that it is a short circuit within the context of the receptacle, and so while it's true that

there's also VBUS and ground contacts -- there are also VBUS and ground contacts in the connector, there's no confusion as to what are the relevant VBUS and ground contacts for purposes of the claim because it's recited."), 52:4–9 (Patent Owner arguing that “the antecedent basis reference to the electronic short circuit prevention device is going back to the one right above that says that it's an electronic short circuit prevention device to prevent this particular short circuit, which is the one between the contacts of the receptacle”).

Petitioner responds that Patent Owner's argument regarding the antecedent basis “sidesteps the two sets of VBUS and GND contacts on the ‘sets of mutually opposed contacts’ on the multi-contact connector.” Sur-reply Amend 2. Petitioner further argues that the fact that one of the VBUS contacts of the connector connects to the VBUS contact of the receptacle is not enough to resolve the ambiguity in the claims. *Id.*

(2) *Our Analysis*

We begin our analysis with the words of the claims. Proposed substitute claim 25 recites that the receptacle has contacts and the connector has “mutually opposed contacts.” Mot. Amend. 26. Thus, the claim recites 3 sets of contacts: one on the receptacle, one on the active side of the connector, and one on the inactive<sup>29</sup> side of the connector. The last limitation recited in proposed claim 25 refers to “VBUS and GND contacts”; however, the limitation does not explicitly state whether it is referring to the

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<sup>29</sup> We have adopted Patent Owner's use of the terms “active” and “inactive.” Active contacts refer to the contacts on the connector that are directly coupled to the contacts of the receptacle. Inactive contacts “refer to the contacts on the connector that are not directly coupled to the contacts of the receptacle.” PO Resp. 6 n.1.

receptacle's contacts, the connector's active contacts, the connector's inactive contacts, or a combination of the above.

As an initial matter, we agree with Patent Owner that, based on the plain language of proposed substitute claim 25, a person having ordinary skill in the art would have understood that the claim limitation at issue could be referring to the contacts of the receptacle. The limitation recites that the “electronic short circuit prevention device is operable to prevent a short circuit between VBUS and GND contacts.” Mot Amend. 27. Elsewhere, proposed substitute claim 25 recites that the short circuit prevention device “prevent[s] an electric short circuit *between contacts of the receptacle* on inserting the multi-contact connector therein.” *Id.* at 26 (emphasis added). Because the short circuit prevention device is described as preventing a short circuit between contacts of the receptacle, a person having ordinary skill in the art could draw the conclusion that the last limitation in proposed substitute claim 25 is referring to the contacts of the receptacle. *See* Tr. 52:4–9.

However, the sections of the '870 application Patent Owner directs us to (Reply Amend 3 (citing Ex. 2005, 3:19–22, 10:13–17)) lead us to an alternative construction. The relevant sections state as follows:

But worse than this there exists then the danger that *the USB  $V_{BUS}$  contacts* of the card will contact the resilient leaves 11 which are usually metallic and are coupled to GND via the rectangular frame to which they are connected. *This would cause the  $V_{BUS}$  contacts to short to GND and must be avoided.*

...

Fig. 2e shows an alternative solution to the short circuit problem, *wherein the  $V_{BUS}$  and GND contacts of the USB connector 20* are connected to a relay unit 31 that transfers only forward current from the  $V_{BUS}$  contacts and does not open the

circuit if GND is in contact with one of the  $V_{\text{BUS}}$  wires. Alternatively, the relay unit 31 may also be connected to each of the  $V_{\text{BUS}}$  contacts by itself.

Ex. 2005, 3:19–22, 10:13–17 (emphasis added). Each of those sections—which Patent Owner cites to—refers to the  $V_{\text{BUS}}$  contacts of the USB connector, not the receptacle as being relevant to the short circuit. Thus, based on Patent Owner’s citations, a person of ordinary skill in the art could reasonably have concluded that the VBUS contact recited in proposed substitute claim 25 is referring to one of the connector’s contacts.

Other sections of the ’870 application similarly support both potential constructions. On the one hand, the ’870 application describes how a diode can be used to prevent a short circuit through one of the connector’s  $V_{\text{BUS}}$  contacts. Ex. 2005, 9:22–25 (describing a short circuit between the contacts of the male connector and the receptacle’s leaves), 9:26–10:12 (describing preventing a short circuit between a connector’s  $V_{\text{BUS}}$  contact and GND).<sup>30</sup> On the other hand, the ’870 application describes the short circuit occurring between the contacts of the receptacle. *Id.* at 25:13–16.

Based on the lack of specificity in the language of proposed substitute claim 25 and the various descriptions in the ’870 application discussed above, the VBUS contact recited in proposed substitute claim 25 may refer to a contact of the receptacle, an active contact on the connector or an inactive contact on the connector. This creates ambiguity and fails to delineate with reasonable certainty the scope of the claim. Accordingly, we are persuaded the proposed substitute claim 25 is indefinite under both the

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<sup>30</sup> Additionally, the prosecution history of the ’825 patent identifies the short circuit occurring between the inactive VBUS contact of the connector with the metal of the receptacle. Ex. 2006, 10, 11.

*Packard* and the *Nautilus* standards. Additionally, because proposed substitute claims 29, 30, and 32–48 depend from claim 25 and do not resolve the ambiguity, we are similarly persuaded the proposed substitute claims are indefinite under both the *Packard* and the *Nautilus* standards.

In consideration of the above, we agree with Petitioner that proposed substitute claims 25, 29, 30, and 32–48 are indefinite.

Accordingly, we deny Patent Owner’s Motion to Amend as to substitute claims 25, 29, 30, and 32–48.

*c) Claims 26 and Claims 27*

Proposed substitute claims 26 and 27 recite a similar limitation to the “VBUS and GND contacts” limitation discussed in the preceding section. Similar to claim 25, both claims 26 and 27 refer to VBUS without specifying whether it is referring to one of the VBUS contacts of the connector or the VBUS contact of the receptacle. Specifically claim 26 recites “the electronic short circuit prevention device is operable to prevent a short circuit between VBUS and GND” and claim 27 recites “the electronic short circuit prevention device is operable to prevent a short circuit between VBUS and the leaves.” Mot. Amend 28–29.

Petitioner and Patent Owner rely on the same arguments discussed in subsection b, above. *See* Opp. Amend. 2; Reply Amend 2; Sur-reply Amend 1–2. Because there is no difference between the VBUS contact recited in claim 25 and the VBUS recited in claims 26 and 27, we are persuaded the proposed substitute claims 26 and 27 are indefinite under both the *Packard* and the *Nautilus* standards for the same reasons we discuss above.

In consideration of the above, we agree with Petitioner that proposed substitute claims 26 and 27 are indefinite.

Accordingly, we deny Patent Owner's Motion to Amend as to substitute claims 26 and 27.

6. *Enablement*

“The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation.” *United States v. Telectronics, Inc.*, 857 F.2d 778, 785 (Fed. Cir. 1988). “[A] patent specification complies with the statute even if a ‘reasonable’ amount of routine experimentation is required in order to practice a claimed invention.” *Enzo Biochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1371 (Fed. Cir. 1999). Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

a) *The Parties’ Arguments*

Proposed substitute claim 28 recites that the connector is “USB-compatible or mini-USB compatible” and that “the opposite surfaces supporting the first and second sets of mutually opposed contacts [of the connector] have a length of less than 6 mm, width greater than 3 mm and distance between the opposite surfaces of less than 1.1 mm but more than 0.3 mm.” Mot. Amend 29–30. The claim further recites “the multi-contact connector being able to mate electrically with one of USB 1.0 or USB 2.0 sockets.” *Id.* at 30. Proposed substitute claim 30, which depends from claim 25, has substantially the same limitations. *See id.* at 26–27, 30.

Petitioner argues that proposed substitute claims 28 and 30 are not enabled. Opp. Amend 11–12. According to Petitioner, the size limitations recited in claims 28 and 30 restrict the connector to a mini-USB sized

connector. *Id.* at 11 (citing Ex. 1035 ¶¶ 27, 65–66). Petitioner further argues a “USB 1.0 socket is not compatible with a mini-USB connector.” *Id.* (citing Ex. 1035 ¶ 67). Petitioner further argues a person having ordinary skill in the art would have understood “that a double-sided mini-USB connector that meets the size limitations recited in Claim[s] 28 [or 30] could not be ‘able to mate electrically’ with a USB 1.0 socket because such a connector would not be able to fit any USB 1.0 socket in existence.” *Id.* at 11–12 (citing Ex. 1035 ¶¶ 67–68).

Patent Owner responds that Petitioner “erroneously equate ‘mate electrically’ with ‘mate physically.’” Reply Amend 3. According to Patent Owner, the claims do not require physical mating. *Id.* at 3–4 (citing Ex. 2007 ¶ 21).

Patent Owner further argues that, to the extent the claims require a physical mating, “Petitioners’ allegations amount merely to an assertion that the claims encompass an inoperative embodiment” and that “[a] claim that covers an inoperative embodiment does not fail for lack of enablement.” Reply Amend 4 (citing *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569, 1576–77 (Fed. Cir. 1984)).

In its Sur-reply, Petitioner argues that proposed substitute claims 28 and 30 require a physical mating with a standard USB receptacle. Sur-reply Amend 2 (citing Ex. 2005, 3:14–22, 4:7–8, 10:8–12, 25:8–11). Petitioner also argues that “Patent Owner had to concede that it is impossible for a connector meeting the size limitation in the claims to mate with a USB 1.0 socket. *Id.* at 3.

Petitioner further argues that *Atlas Powder* does not apply. Sur-reply Amend 3. According to Petitioner, “the *Atlas* court merely held that if the

number of inoperative combinations in a chemical case becomes significant, and in effect forces one of ordinary skill in the art to experiment unduly to practice the claimed invention, the claims might indeed be invalid.” *Id.* Petitioner further argues that in this case the claim scope is impossible to implement no matter how much experimentation is performed. *Id.*

*b) Our Analysis*

We are persuaded that Petitioner has shown by a preponderance of the evidence that proposed substitute claims 28 and 30 are not enabled.

Specifically, the claims both require that “the multi-contact connector to be connected in two opposed orientations directly to a corresponding USB-compatible receptacle . . . to prevent an electric short circuit . . . on inserting the multi-contact connector therein.” Mot. Amend 26–27, 29–30. The ordinary meaning of those limitations is that the connector is physically mated with the receptacle. Indeed, the problem that the ’825 patent is directed to is preventing a short circuit when a connector is placed within a plug. *See* Ex. 1001, 2:41–53.

We further conclude that proposed substitute claims 28 and 30 are limited to mini-USB compatible connectors. Both claims require that the connector be “USB-compatible or mini-USB compatible” and recite physical dimensions that limit the connectors to mini-USB connectors. *See* Mot. Amend 26–27, 29–30; Ex. 1035 ¶¶ 27, 66 (discussing the dimensions). Because a full-sized USB-compatible connector does not have the dimensions recited in proposed substitute claims 28 or 30, the claims are limited to mini-USB compatible connectors. *See* Ex. 1035 ¶ 66.

Nor is there any dispute that a mini-USB connector cannot physically mate with a USB 1.0 socket. Dr. Baker testifies that “[i]t would be

impossible for a mini-USB connector to mate electrically with a USB 1.0 socket because there was no such thing as a mini USB 1.0 socket.” Ex. 1035 ¶ 67. Similarly, Dr. Fernald testifies that a person having ordinary skill in the art “would readily understand that there is no mini USB receptacle in the USB 1.0 standard.” Ex. 2007 ¶ 22. Therefore, a person having ordinary skill in the art could not, with any amount of experimentation, be able to use a mini-USB compatible connector with a USB 1.0 socket as recited in claims 28 and 30.

We do not find Patent Owner’s reliance on *Atlas Powder* persuasive. In *Atlas Powder*, the accused infringer argued that the specification identified “numerous salts, fuels, and emulsifiers that could form thousands of emulsions” covered by the claims, without teaching which specific combinations would work. 750 F.2d at 1576. The district court and the Federal Circuit disagreed, holding that “one skilled in the art would know how to select a salt and fuel and then apply ‘Bancroft’s Rule’ to determine the proper emulsifier.” *Id.* According to the Federal Circuit, “[e]ven if some of the claimed combinations were inoperative, the claims are not necessarily invalid.” *Id.* Instead, the Federal Circuit held that only “if the number of inoperative combinations becomes significant, and in effect forces one of ordinary skill in the art to experiment unduly in order to practice the claimed invention, the claims might indeed be invalid.” *Id.* at 1576–77 (citation omitted).

However, *Atlas Powder* is not analogous to the undisputed facts of this case. It is undisputed that no one could select a connector that satisfies the dimensional limitations recited in proposed substitute claims 28 and 30 to physically mate with a USB 1.0 connector. *See* Ex. 1035 ¶ 67; Ex. 2007

¶ 22. Thus, unlike in *Atlas Powder*, a person having ordinary skill in the art would never be able to make an embodiment that satisfied these claims.

Instead, the facts of this case are analogous to those in *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371 (Fed. Cir. 2007). In that case, the Federal Circuit held that “the full scope of the claimed invention includes, an injector system with and without a pressure jacket.” *Id.* at 1380. The Federal Circuit held that, because the evidence showed that, at the time of the invention, a system without a pressure jacket could not have been produced, the claimed invention was not enabled: “There must be ‘reasonable enablement of the scope of the range’ which, in this case, includes both injector systems with and without a pressure jacket.” *Id.* (citing *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1244 (Fed. Cir. 2003)).

Like in *Liebel-Flarsheim*, the specification of the ’825 patent does not provide a “reasonable enablement of ‘the scope of the range’” of the claims. Specifically, for the reasons discussed above, it is undisputed that a person having ordinary skill in the art could not make a mini-USB compatible connector that could be used with a USB 1.0 socket. *See* Ex. 1035 ¶ 67; Ex. 2007 ¶ 22. Therefore, there is not a reasonable enablement of the full scope of the range of proposed substitute claims 28 and 30 and, therefore, Petitioner has shown by a preponderance of the evidence that proposed substitute claims 28 and 30 are not enabled.

Accordingly, we deny Patent Owner's Motion to Amend as to proposed substitute claims 28 and 30.

7. *Conclusion on Motion to Amend*

For the reasons discussed above, Patent Owner has not established that proposed substitute claims 26, 29, 31, and 34 are supported by the original disclosure of the '825 patent. Additionally, Petitioner has shown by a preponderance of the evidence that proposed substitute claims 25–27, 29, 30, and 32–48 are indefinite and proposed substitute claims 28 and 30 are not enabled. Accordingly, Patent Owner's Conditional Motion to Amend is *denied*.<sup>31</sup>

CONCLUSION<sup>32</sup>

In summary:

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<sup>31</sup> In light of the dispositive nature of these determinations, we do not reach the other issues raised by Patent Owner's Motion to Amend, including the additional arguments Petitioner presents as to why the Motion to Amend should be denied. No implications, especially regarding the merits, should be drawn from our failure to decide these issues. The only reason we do not decide these issues is because it is unnecessary for us to do so. *See Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (explaining that an administrative agency is at liberty to reach a decision based on a dispositive issue because doing so “can not only save the parties, the [agency], and [the reviewing] court unnecessary cost and effort,” but can “greatly ease the burden on [an agency] faced with a . . . proceeding involving numerous complex issues and required by statute to reach its conclusion within rigid time limits”).

<sup>32</sup> Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Final Written 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 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).

| <b>Claim(s)</b>                             | <b>35<br/>U.S.C. §</b> | <b>Reference(s)</b>            | <b>Claims<br/>Shown<br/>Unpatentable</b> | <b>Claims<br/>Not shown<br/>Unpatentable</b> |
|---------------------------------------------|------------------------|--------------------------------|------------------------------------------|----------------------------------------------|
| 1, 2, 4, 8, 9                               | 102(e)                 | Harkabi                        | 1, 2, 4, 8, 9                            |                                              |
| 1, 2, 4, 8–10                               | 103(a)                 | Harkabi                        | 1, 2, 4, 8–10                            |                                              |
| 5                                           | 103(a)                 | Harkabi, EDN                   | 5                                        |                                              |
| 6                                           | 103(a)                 | Harkabi, Wiener                | 6                                        |                                              |
| 3, 6                                        | 103(a)                 | Harkabi, USB 2.0 Specification | 3, 6                                     |                                              |
| 7, 22                                       | 103(a)                 | Harkabi, Hisano                | 7, 22                                    |                                              |
| 13–15, 18                                   | 103(a)                 | Harkabi, Le                    | 13–15, 18                                |                                              |
| 11, 12                                      | 103(a)                 | Harkabi, Benayoun              | 11, 12                                   |                                              |
| 16, 17, 23, 24                              | 103(a)                 | Harkabi, Kim                   | 16, 17, 23, 24                           |                                              |
| 19                                          | 103(a)                 | Harkabi, Funahashi             | 19                                       |                                              |
| 20, 21                                      | 103(a)                 | Poo                            | 20, 21                                   |                                              |
| <b>Overall Outcome</b>                      |                        |                                | 1–24                                     |                                              |
| <b>Motion to Amend Outcome</b>              |                        |                                | <b>Claim(s)</b>                          |                                              |
| Original Claims Cancelled by Amendment      |                        |                                |                                          |                                              |
| Substitute Claims Proposed in the Amendment |                        |                                | 25–48                                    |                                              |
| Substitute Claims: Motion to Amend Granted  |                        |                                |                                          |                                              |
| Substitute Claims: Motion to Amend Denied   |                        |                                | 25–48                                    |                                              |
| Substitute Claims: Not Reached              |                        |                                |                                          |                                              |

## ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–24 of the '825 patent are held *unpatentable*;

FURTHER ORDERED that Patent Owner's Contingent Motion to Amend is *denied*; and

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

IPR2018-01538  
Patent 7,458,825 B2

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