

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AFFORDABLE WIRE MANAGEMENT, LLC,

Petitioner,

v.

CAMBRIA COUNTY ASSOCIATION FOR
THE BLIND AND HANDICAPPED, INC.,

Patent Owner.

IPR2024-00139
Patent 10,177,551

**PATENT OWNER'S RESPONSE TO
PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 10,177,551**

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<i>Dome Patent L.P. v. Lee</i> , 799 F.3d 1372 (Fed. Cir. 2015)	61
<i>Fox Factory, Inc. v. SRAM, LLC</i> , 944 F.3d 1366 (Fed. Cir. 2019)	60
<i>Geo. M. Martin Co. v. Alliance Mach. Sys. Int'l LLC</i> , 618 F.3d 1294 (Fed. Cir. 2010)	65
<i>Liqwd, Inc. v. L'Oreal USA, Inc.</i> , 941 F.3d 1133 (Fed. Cir. 2019)	60
<i>Microsoft Corp. v. Enfish, LLC</i> , 662 F. App'x 981 (Fed. Cir. 2016) (unpublished).....	47
<i>Mintz v. Dietz & Watson, Inc.</i> , 679 F.3d 1372 (Fed. Cir. 2012)	60
<i>Ormco Corp. v. Align Tech., Inc.</i> , 463 F.3d 1299 (Fed. Cir. 2006)	63
<i>WBIP, LLC v. Kohler</i> , 829 F.3d 1317 (Fed. Cir. 2016)	67, 68

Other Authorities

37 C.F.R. § 42.6(a)(3)	58, 59, 60
37 C.F.R. §42.65(a).....	52, 59, 60

TABLE OF PATENT OWNER EXHIBITS

Exhibit	Description
2001	Declaration of Joshua Phinney, Ph.D.
2002	Petitioner's Invalidity Contentions
2003	[RESERVED]
2004	Transcript of Deposition of Omid Beik, Ph.D., July 9, 2024
2005	Excerpts from CAB Installation Guide
2006	EX1005 (marked by Dr. Beik at deposition)
2007	EX1006 (marked by DR. Beik at deposition)
2008	SunPower Field Process Change Review 1 Development Review
2009	Intersolar Award Finalist – Photovoltaics (2014)
2010	Email dated April 7, 2015
2011	Email dated April 10, 2015
2012	Email dated July 2, 2015
2013	Email dated September 15, 2015
2014	Email dated September 21, 2015
2015	Email dated October 2, 2015
2016	PV Magazine "The Array Changers: 50 Key Components Making PV Shine"
2017	Email dated January 18, 2016
2018	SolarPro Magazine (July/August 2016)
2019	Email dated May 20, 2016
2020	RP Construction Services Press Release (July 26, 2018)
2021	NECA Show Stopper Award (2018)
2022	Electrical Contractors Magazine (January 2019)
2023	Top Solar Component Products (2019)
2024	Top Solar Components and Equipment (2021)
2025	PV Magazine Award (2021)
2026	Leadership in Solar Energy Award (2022)
2027	Leadership in Solar Energy Award (2023)
2028	Declaration of Mitchel F. Bowman
2029	CV of Mitchel F. Bowman
2030	SunEdison, CAB Prototyping at SolarTac
2031	Email dated November 14, 2014
2032	Email dated August 17, 2015
2033	Declaration of William F. Brooks, PE
2034	CV of William F. Brooks, PE
2035	Solar Market Insight Report, 2023 Year in Review

2036	National Renewable Energy Laboratory, Spring 2014 Solar Industry Update
2037	Brooks, Engineering, Cable Management in Solar PV Arrays: A Review of Requirements in the 2017 and 2020 Editions of the National Electrical Code and how CAB Solar Hangers Meet These Requirements (November 25, 2020)
2038	Declaration of Edward C. Kern, Jr., Ph.D.
2039	CV of Edward C. Kern, Jr., Ph.D.
2040	[RESERVED]
2041	CAB Solar Cable Management Installation Guide (January 28, 2022)
2042	Solar Project Quote Request/CAB Quote #1
2043	Intertek, CDR/Authorization to Mark
2044	Declaration of Jonathan D. Putnam, Ph.D.
2045	CV of Jonathan D. Putnam, Ph.D.
2046	Solar Sales Figures Spreadsheet #1
2047	Comparison of Solar Cable Management Systems
2048	Compare CAB Solar vs. Trenching or Cable Tray
2049	Cost Comparison of CAB Standard vs Integrated Cable Management System
2050	Solar Project Quote Request/CAB Quote #2
2051	Solar Project Quote Request/CAB Quote #3
2052	Solar Project Quote Request/CAB Quote #4
2053	Solar Project Quote Request/CAB Quote #5
2054	Solar Project Quote Request/CAB Quote #6
2055	National Electric Code (2014)
2056	Solar Sales Figures Spreadsheet #2
2057	Solar Project Drawings
2058	Declaration of Denise L. Studinary
2059	Declaration of Joseph William Novak, PE, MSE, MBA, S.P.
2060	Solar Pro Magazine (February/March 2013)
2061	Declaration of Allen Garrett Smith
2062	CAB Cable Rings & Saddles for Solar Panel Wiring (2013)
2063	Wind and Solar Systems: Design, Analysis and Operation, Third Edition
2064	Declaration of Joshua Phinney, Ph.D.
2065	CV of Joshua Phinney, Ph.D.
2066	HDR Report

I. INTRODUCTION

Patent Owner Cambria County Association for the Blind and Handicapped, Inc. ("CAB" or "Patent Owner") submits its Response to Petitioner Affordable Wire Management, LLC's ("AWM") Petition for *Inter Partes* Review (Paper 1) of claim 1-19 of U.S. Patent No. 10,177,551 ("551 Patent") (EX1001).

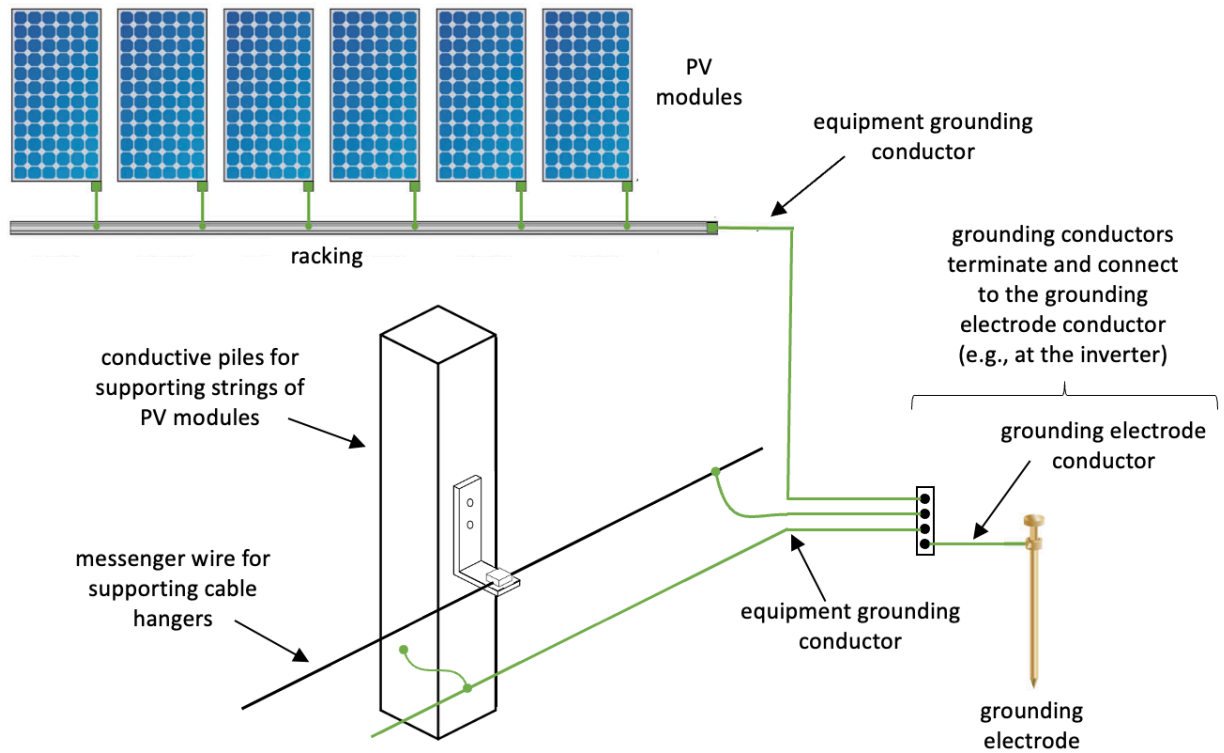
II. BACKGROUND REGARDING GROUNDING SYSTEMS

Prior to the filing of the '551 Patent on October 5, 2017, safety benchmarks such as the National Fire Protection Association's NFPA 70: NATIONAL ELECTRICAL CODE ("NEC") required that non-current-carrying metal components of an electrical power system (such as metallic supports, raceways, and enclosures) be bonded to one another ("bonding"), and separately be grounded through the use of a grounding conductor ("grounding"). EX2064, ¶38. An NEC-compliant grounding system protects individuals from electrical shock hazards and against faults. EX2064, ¶39.

A. GROUNDING

In photovoltaic ("PV") systems (depiction reproduced below),¹ exposed metal parts of equipment all must be grounded. *Id.*, ¶34; EX1007, 587.

¹ Although the claims of the '551 Patent are not limited to PV installations, Dr. Phinney's discussion of background information is focused on grounding systems



The racking, piles, bracket hardware and messenger wire equipment illustrated in the figure above serve *a support function* and do not normally carry current.

EX2064, ¶41. However, the equipment is likely to become energized in the event of a fault. *Id.* The NEC requires that exposed non-current carrying metal parts in a PV array be grounded regardless of voltage, and regardless of whether any of the current-carrying conductors from the PV array are grounded. EX2064, ¶42; EX1007, 587. The equipment illustrated above is grounded by being connected

in PV installations because a majority of Petitioner's asserted references, including the CAB Website (EX1005) and CAB Whitepaper (EX1006), relate to PV installations.

through ***grounding conductor(s)*** to a ***grounding electrode***. *Id.* The equipment ***cannot*** be grounded by virtue of being embedded in the earth. *Id.*, ¶42.

1. Grounding Conductors

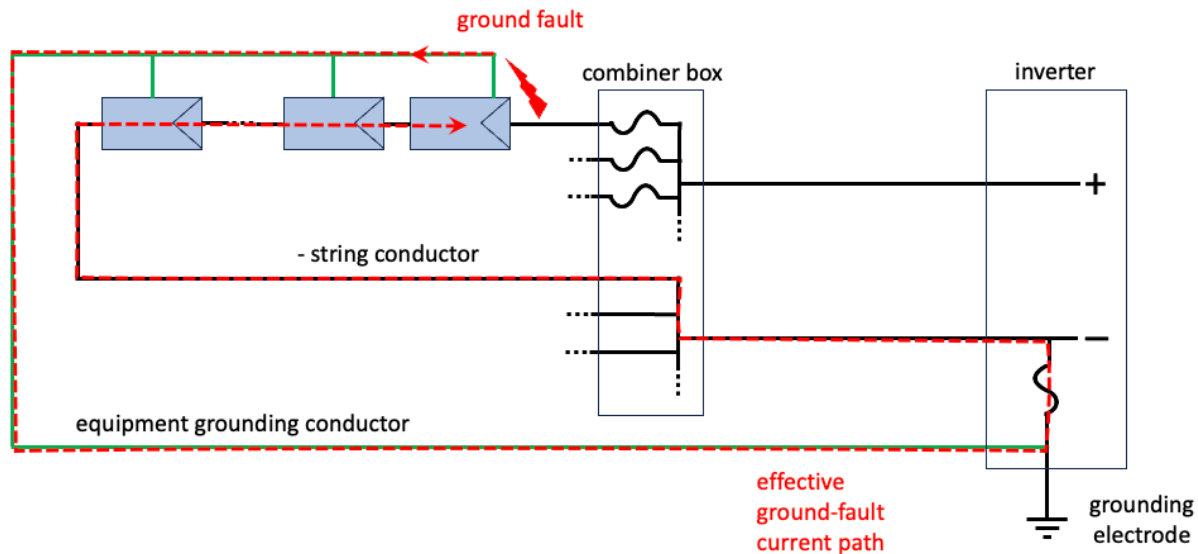
There are two types of grounding conductors: the grounding electrode conductor (“GEC”) and the equipment grounding conductor (“EGC”). *Id.*, ¶43. A grounding electrode is an electrically conductive solid rod or other structure whose size and surface area are sufficient to permit adequate contact with the earth in which it is buried or driven for grounding. *Id.*, ¶44. The GEC connects to the grounding electrode. *Id.* In the figure above, the GEC and its grounding electrode are located at the inverter that converts DC power carried by strings of PV modules to AC power. *Id.*

An EGC is the conductive path installed to connect normally non-current-carrying metal parts of equipment together and to one or both of the system or circuit conductor that is intentionally grounded or the GEC. *Id.*, ¶45 (citing EX1007, 31).

The EGC is not intended to, and does not, carry current under normal conditions. *Id.*, ¶46. In the event of a ground-fault, however, the EGC provides an intentionally constructed effective, low-impedance ground-fault current path – what the NEC defines as an ***“effective ground fault current path”*** – from the point of a ground-fault on the wiring system to the electrical supply source in order to

cause an overcurrent protection device to open the circuit and to clear the fault. *Id.* (citing EX1007, 99); EX2004, 22:14-17; EX2004, 22:18-23:24.²

The figure below depicts an effective ground fault current path in a PV system.



² Dr. Beik was deposed on July 9, 2024 in IPR2024-00178, and July 11, 2024 in IPR2024-00139. During the first deposition, counsel stipulated that EX2004 would include the transcripts of both days of testimony. Thus, EX2004 contains the transcript from July 9, 2024 (Volume I, stamped pages 1-216) and the transcript from July 11, 2024 (Volume II, stamped pages 217-410). For ease of reference by the Board, all citations herein to EX2004 are to the page and line numbers of the transcript for Volume II, which begins on stamped page 217.

In the figure, the red (positive) dashed lines show the path that ground-fault currents take through EGCs to the inverter, and back to the source. EX2064, ¶48.

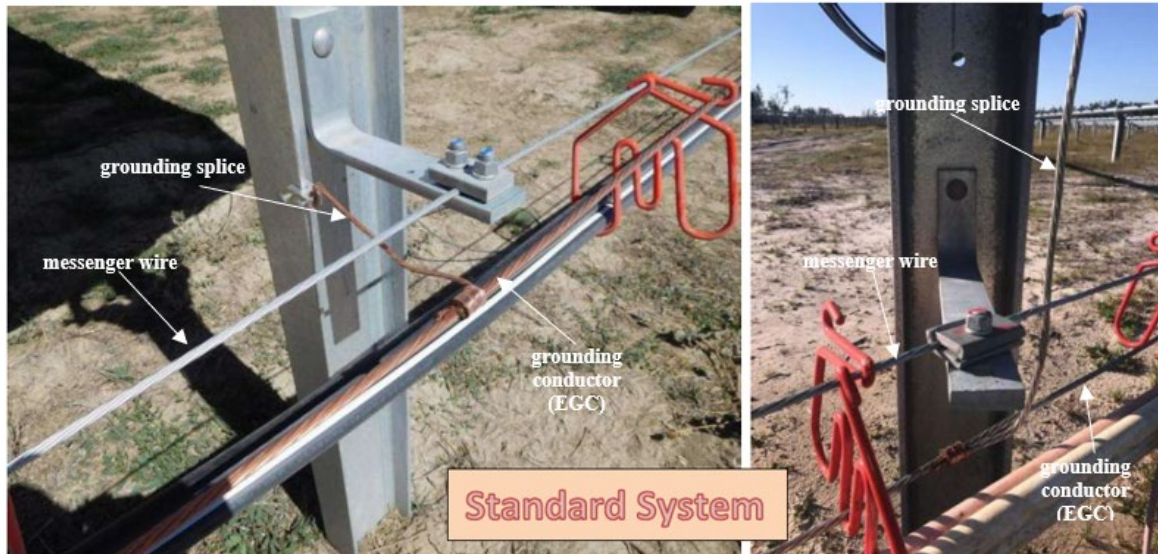
In this system, all ground-fault currents pass through a fuse, for example, through which the negative conductor is grounded at the inverter, where the ground-fault protection device is located, or alternatively, some other protection device. *Id.* (citing EX1007, 587).

The NEC requires that an EGC be installed between a PV array and, for example, an inverter, and that the EGC run with the PV-circuit conductors where they leave the PV array. *Id.*, ¶49 (citing EX1007, 587-588; EX1001, 1:65-2:16).

The NEC requires that the EGC, in keeping with its electrical function, be sized for the largest overcurrent device protecting other conductors in the raceway. *Id.* (citing EX1007, 120-121, 588).

2. Messenger Wire

As of the '551 Patent priority date, CAB sold an above-ground cable management system that uses cable hangers suspended from a messenger wire to organize the many conductors in commercial PV installations ("Standard System"). EX2064, ¶50. In CAB's Standard System, the messenger wire was separate from the EGC. The figure below depicts a typical installation of CAB's Standard System.



EX2064, ¶50; EX2041, 2. As depicted above, CAB's Standard System includes a grounding conductor installed parallel to the messenger wire, with grounding splices to each pile. EX2064, ¶¶50, 73. The **grounding conductor** performs an **electrical function** and serves as an EGC in compliance with NEC requirements. *Id.* The **messenger wire**, however, serves only a **mechanical function**, and therefore is a metal component of the system that **must be grounded**. *Id.*, ¶51. As such, a messenger wire in a PV system (as with all other exposed metal parts), must be grounded. *Id.* (citing EX1007, 241).

Although “messenger wire” first appeared as a defined term in the 2020 edition of the NEC, a person of ordinary skill in the art (“POSITA”)³ would have

³ For purposes of this Response, Patent Owner has applied the Board's preliminary determination regarding the applicable level of ordinary skill in the art: “a

understood that messenger wires in PV solar installations and other electrical power systems typically were made of metal and provided mechanical support for other electrical cables. EX2064, ¶52. A POSITA also would have understood that, although messenger wires were metal and conductive, they were selected for their strength rather than their ampacity, as they were not structured to carry a current or to provide a current path. *Id.*, ¶¶52, 54. CAB Standard System, therefore, relies on a parallel grounding conductor sized only according to the overcurrent protection device. *Id.*, ¶53; EX2041.

CAB's "Integrated Grounding System" ("CAB Integrated Grounding System") that embodies the '551 Patent, uses a "multi-function line," a messenger wire that provides both a mechanical support function and an electrical function as a grounding conductor that provides an effective ground fault current path. CAB's Integrated Grounding System eliminates the need to install a grounding conductor separate from the messenger wire, as well as splices from the grounding conductor to each metal pile, thereby reducing labor and material costs. EX1001, 1:60-2:44; EX2064, ¶¶55, 62.

bachelor's degree in an engineering discipline and two years of experience in electrical power systems." Paper 21, 5-6.

B. BONDING

In electrical systems, “bonding” permanently joins metallic parts to form an electrically continuous path, ensuring that currents on metallic parts are conducted safely. EX2064, ¶56. Properly bonded systems have the same electrical potential as the grounding portion of the electrical system. *Id.* Bonded metal parts not intended to carry current must nevertheless be able to safely carry current in the event that current is imposed on them. *Id.*, ¶57. Bonding minimizes the voltage difference between the different conductive components in the system when fault current is imposed on them, and also ensures that the fault current, wherever it originates in the system, returns to the electrical supply via an effective ground-fault current path. *Id.*, ¶¶57-58; EX1028, 93. The effective ground-fault current path must have sufficiently low electrical resistance to the supply source so fault current will quickly rise to a level that will open the circuit overcurrent protection device. *Id.*, ¶¶57-58; EX1007, 99. The grounding conductor, together with the other properly bonded metal parts, establishes an effective ground fault-current path to detect and/or clear faults in accordance with the NEC. EX2064, ¶¶59-60 (quoting EX1007, 99).

Importantly, the earth is insufficient to provide an effective ground fault current path. EX1007, 99. In PV systems, for example, while the conductive piles can be part of a conductive path to the earth for lightning-strike current, a POSITA

would recognize that that path to the earth through the conductive piles is not the required effective ground fault current path. EX2064, ¶61. Rather, the required effective ground fault current path can only be provided by the EGC properly bonded with other metallic parts of the system. *Id.*

III. THE '551 PATENT AND ITS PROSECUTION HISTORY

A. THE '551 PATENT

The '551 Patent, titled "Grounding System," issued January 8, 2019, and is assigned to CAB. The objective of the '551 invention is to eliminate the need for an EGC separate from the messenger wire, and further to avoid the need to run splices from the separate grounding conductor to each metal pile. EX1001, 1:60-2:44; EX2064, ¶76. These benefits result in savings in material and installation costs and are realized both by the multi-function line and the multi-function line couplings, which are part of the conductive mounting assembly and define a conductive path. EX2064, ¶¶55, 62, 319. In this manner, the multi-function line and its couplings provide the effective ground-fault current path that would otherwise be provided by the separate EGC and grounding splices to the EGC. Ex. 1001, 1:67-2:16; EX2064, ¶55, 62.

The '551 Patent discloses a grounding system structured to ground a number of cables supported by a support assembly. EX1001, Abstract, 2:24-27, 12:11-23. The invention accomplishes grounding by the use of a "multi-function line" and a

number of conductive mounting assemblies, where each conductive mounting assembly is structured to be coupled to the multi-function line and to a conductive pile. EX1001, Abstract, 2:27-31, 12:15-20.

Set forth below is representative independent claim 1, directed to a grounding system:

1. A grounding system structured to ground a number of cables supported by a support assembly, said support assembly including a plurality of spaced, conductive piles, said grounding system comprising:
 - a multi-function line assembly including a multi-function line;
 - a number of conductive mounting assemblies, each said conductive mounting assembly structured to be coupled to said multi-function line and to a conductive pile; and
 - wherein said multi-function line assembly is coupled to, and in electrical communication with, said number of conductive mounting assemblies.

The '551 Patent's claimed multi-function line serves two purposes. First, it physically supports cable hangers that, in turn, support electrical cables. EX2064, ¶63. Second, it serves as an EGC that provides an effective ground fault current path for the system. *Id.* As the specification explicitly defines, "a single multi-function line supports the cable hangers, as a messenger wire, and provides a current path, ***as a grounding conductor.***" EX1001 2:35-37 (emphasis added). Figure 7 (reproduced below) depicts the multi-function line as comprised of

conductive copper and copper-clad steel strands, strong enough to support cable hangers and electrical wires, and sufficiently conductive to serve as an EGC.

EX1001, 8:67-9:6; EX2064, ¶63.

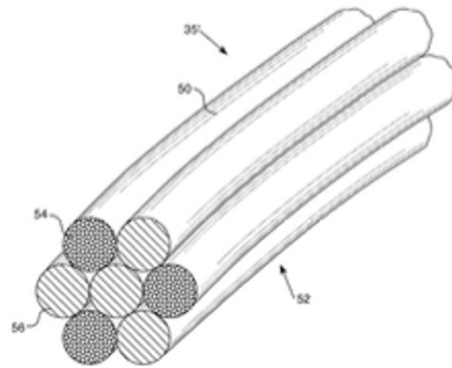


FIG. 7

EX1001, FIG. 7.

The '551 Patent further discloses and depicts in Figure 1 (reproduced below) that the multi-function line (35) is a “tension member” that is “draw[n] . . . taut” by conductive terminal supports (44) that couple the multi-function line to a support (e.g., a pile). EX1001, 7:17-23, FIG. 1; EX2064, ¶64.

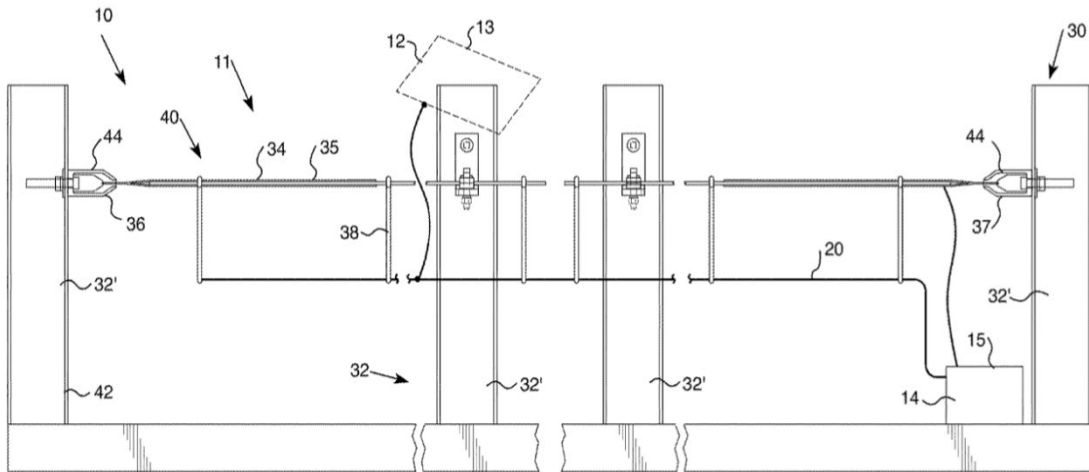


FIG. 1

EX1001, FIG. 1. The '551 Patent's multi-function line is the claimed system's grounding conductor—an intentionally constructed, low-impedance electrically conductive path designed and intended to carry current under ground-fault conditions. EX2064, ¶66. In other words, the multi-function line is an EGC that provides a path to ground for a current in the multi-function line assembly. *Id.* The multi-function line thus supports the cable hangers, as a messenger wire, and provides a current path, as a grounding conductor. EX1001, 2:35-37; EX2064, ¶68.

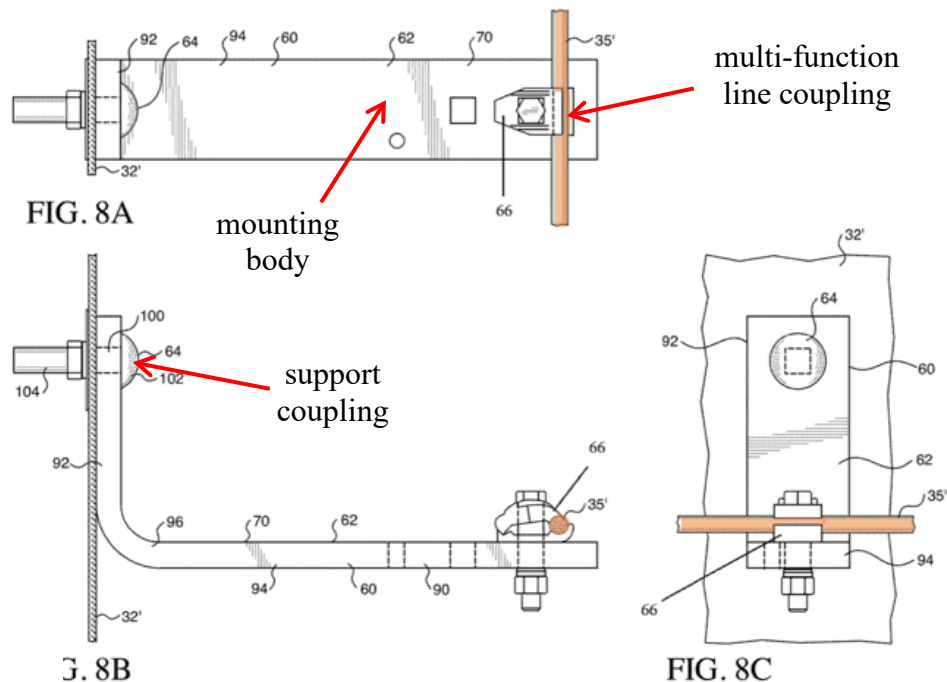
A POSITA would understand that the claimed multi-function line must provide an effective ground fault current path from the point of a ground-fault on the wiring system to the electrical supply source in order to cause an overcurrent protection device to open the circuit and to clear the fault. EX2064, ¶67. While the specification refers to conductive mounting assemblies that are coupled to the

multi-function line and to a conductive pile in a configuration that provides a path to ground (EX1001, 2:27-33), a POSITA would understand that a path to the earth through the conductive pile would **not** be the effective ground fault current path required by the NEC for grounding the system. *Id.* Dr. Beik agreed that the earth may not be used as the sole EGC fault current path. EX2004, 26:13-21 (referring to Section 2.1.2 of the 2007 IEEE Green Book, excerpted from EX1028). It is **only** the EGC that provides the necessary effective ground fault current path “from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground fault detectors.” *Id.* (citing EX1007, 99).

Additionally, the multi-function line supports the cable hangers (which in turn support the current wires, data wires and other wires). EX2064, ¶68 (citing EX1001, 2:33-35). That is, a single multi-function line supports the cable hangers, **as a messenger wire**, and provides a current path, **as a grounding conductor**. *Id.* (citing EX1001, 2:35-37) (emphases added). The specification explicitly defines “grounding conductor” to be the grounding conductor that is disposed adjacent the messenger wire. EX1001, 1:67-2:3. The specification also makes clear that many “regulations,” e.g., NEC, require the grounding conductor itself to be grounded, by “splicing a conductor, such as, but not limited to, a copper wire into the grounding

conductor and coupling the copper wire to a grounding cable or, if the piles are conductive, to each pile.” *Id.*, 2:4-10; EX2064, ¶¶71-72; EX2004, 10:17-21.

As shown below in annotated Figures 8A, 8B and 8C of the ‘551 Patent, the claimed grounding system replaces the separate grounding conductor and splices with a multi-function line and conductive mounting assemblies that include a multi-function line coupling, a mounting body and a support coupling to provide the necessary effective ground fault current path.



EX1001, Figs. 8A-8C (annotated); 9:60-10:50; EX2064, ¶74. The claimed grounding system is shown in the photo below, excerpted from CAB's Installation Guide (EX2041, 2), which compares CAB's commercialized Integrated Grounding

System with CAB's Standard System (*see supra*, Section II.A.2).



EX2041, 2; EX2064, ¶75.

In accordance with the '551 invention, because the “multi-function line” is structured to provide an effective ground fault current path, the multi-function line and conductive mounting assembly replace the separate grounding conductor and medial grounding splices used in the prior art. EX2064, ¶¶76-79. A POSITA would appreciate that in order to effectively replace the prior art's separate EGC, the multi-function line cannot simply be any metal cable, but rather, as the NEC

requires, must be constructed in a manner that provides low impedance for an effective ground fault current path, while at the same time be sufficiently robust or strong enough to support cable hangers and current wires. *Id.*, ¶¶78.

The invention's novelty is not, however, and contrary to Petitioner's assertion (Paper 1, 4), limited to the claimed multi-function line. EX2064, ¶80. Rather, the novelty of the '551 Patent is the entirety of the claimed grounding system.

B. PROSECUTION HISTORY

Application No. 15/725,668 (the "'668 Application") that issued as the '551 Patent was filed October 5, 2017. In a Final Office Action rejection dated May 17, 2018, the Examiner rejected certain claims as anticipated by U.S. Patent Application Publication 2012/0024563 ("Korman"), published on February 2, 2012, and that other claims were obvious over Korman in combination with other references. EX1037, 124-133.

Korman discloses a photovoltaic (PV) ac-module grounding system that includes a plurality of PV dc-voltage modules. Each PV dc-voltage module is integrated with a corresponding dc-ac micro-inverter to provide a corresponding PV ac-voltage module. Each PV ac-voltage module includes an ac-voltage plug and play connector that includes a dc ground conductor. *Id.*, 175. Korman discloses rigid metal frames, enclosures, and connector bodies in each module (like the

inverter case 36, the plug and play connectors 42, 43, and the metallic grounding rail 48). *Id.*, 179, 180. The PV-modules are installed on Korman's rigid frames. *Id.*, 175-176. In rejecting the claims, the Examiner stated:

the weight of a line 60 (mass + gravity) creates weight force which is pulling down on the line between connectors 42, 43 and this forms a tension line. Therefore the line of Korman is equivalent to a multi-function line.

Id., 131.

In responding to the Final Office Action rejection, Applicant argued that Korman's "'grounding conducting path' is through frames which are coupled via the connectors 42, 43," and that "Korman never discloses a wire, cable, or any other tension member." *Id.*, 142. *See also id.*, 141 ("Simply put, the Korman system does not include any cables, wires or any other tension member."); *id.*, 143 ("Nothing in Korman discloses that element 60 is a tension member."). The Examiner maintained the rejection.

On appeal, Applicant reiterated that Korman's rigid frame is not a tension member, and, therefore, Korman cannot disclose the claimed multi-function line. *Id.*, 170, 181. Applicant argued that "tension member" means "a construct that has a maximum length when exposed to tension, but is otherwise substantially flexible, such as, but not limited to, a chain or a cable." *Id.*, 173. Applicant again argued that Korman does not disclose a cable or wire. *Id.*, 179-182.

In response to Applicant's brief, on October 24, 2018, the Examiner withdrew his rejection and issued a Notice of Allowability. *Id.*, 207.

IV. PETITIONER'S ASSERTED PRIOR ART

A. CAB WEBSITE

The CAB Website is titled "CAB Cable Rings and Saddles for Solar Cable Management." EX1005; EX2064, ¶¶104-108. The CAB Website showcases the benefits of "CAB Cable Rings and Saddles" including: "strong and durable cable support," "Quick and Easy Installation," "strength and corrosion resistance," as well as a flame-retardant PVC coating for high dielectric strength, abrasion resistance, and grip. The CAB Website includes the photographs reproduced below, intended solely to illustrate the use of CAB's Cable Rings and Saddle Hangers, suspended from what is intended solely to be illustrated as a messenger wire to support electrical cables. EX2064, ¶¶105-106.



EX1005, 3, 5.

The CAB Website emphasizes the properties of CAB Cable Rings and Saddles, including their strength, safety, and coatings, and how they can easily be installed in compliance with NEC and industry installation standards. *See generally* EX1005; *see also* EX2064, ¶107. The CAB Website includes links to download product data and sales information related exclusively to CAB's hangers. *Id.*, 5. The CAB Website makes no reference to a grounding conductor or grounding

system, and includes no links to any components of a grounding system. *See generally* EX1005; *see also* EX2061, ¶¶18-19; EX2064, ¶106.

B. CAB WHITEPAPER

The “CAB Whitepaper,” CABLE MANAGEMENT IN SOLAR PV ARRAYS: A REVIEW OF REQUIREMENTS IN THE NATIONAL ELECTRICAL CODE AND HOW CAB CABLE RINGS AND SADDLES MEET THESE REQUIREMENTS, was prepared by William Brooks of Brooks Engineering.⁴ EX2064, ¶¶109-113. The CAB Whitepaper was used to facilitate CAB’s efforts to address the challenges it faced in marketing an above-ground cable management solution for PV installations. EX1006, 8; EX2061, ¶¶22, 32-33; EX2033, ¶¶44-46. It specifically “focus[es] on the installation of the CAB Cable Rings and Saddles used for cable management in a solar PV array” and addresses whether CAB’s Cable Rings and Saddles could be installed in a manner that complies with NEC requirements. EX1008, 8; EX2061, ¶22; EX2033, ¶¶43-46. These issues reflect the challenges CAB faced in 2014-15 in gaining industry acceptance of its above-ground messenger wire supported cable management system over existing cable management systems that involved

⁴ Mr. Brooks is a leading consultant in the PV industry, with decades of experience, including in evaluating PV solar plants for NEC compliance. *See* EX2061, ¶22; EX2028, ¶43; EX2059, ¶50; EX2033, ¶¶2, 26.

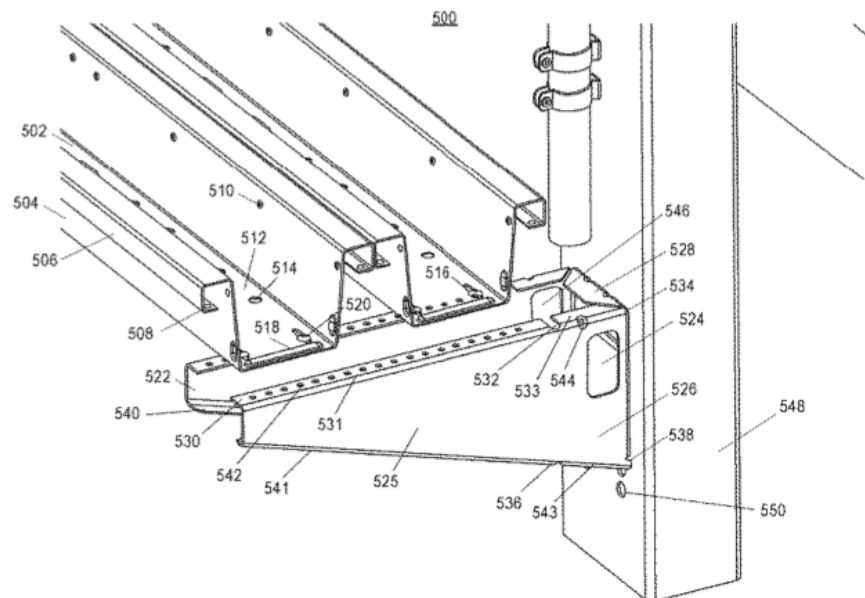
trenching and cable trays. *See* EX1005, 3-4; *see also* EX2061, ¶¶18-19; EX2064, ¶108. The Whitepaper “lay[s] out the basic requirements found in the 2014 NEC and relate[s] those requirements to [CAB’s] Cable Rings and Saddles . . . that are relevant to the NEC requirements and industry standard installation practices.”

EX1006, 7. The CAB Whitepaper concludes that the use of CAB hangers suspended from a messenger wire to support solar electrical cables was compliant with the NEC and other industry-standard installation practices. *See generally* EX1006; *see also* EX2064, ¶112; EX2033, ¶¶45-46, 48.

While the CAB Whitepaper refers to CAB’s Cable Rings and Saddles being in full contact with a “grounded steel messenger wire” (EX1006, 14), that statement is in the context of the electrical industry’s concern with exposed metal parts being in contact with conductors having damaged insulation. *Id.* Mr. Brooks concluded that even if the conductor insulation were to be damaged, the hangers would still remain at or near ground potential since they are in full contact with the grounded messenger wire. *Id.* The CAB Whitepaper makes no suggestion that the “grounded steel messenger wire” acts as a grounding conductor, nor are grounding systems in any way the subject of the CAB Whitepaper. *See generally* EX1006; EX2033, ¶56; EX2064, ¶113.

C. GRUSHKOWITZ

Grushkowitz, U.S. Pat. No. 10,003,298, issued June 19, 2018, is titled “Solar Collector Cable Support Tray and Support System.” EX1003, Title. Grushkowitz’s cable tray and support system comprises metal components including cable trays (502), mounting brackets (522), and vertically-oriented piles (548), which are depicted in Grushkowitz’s Figure 5, below:

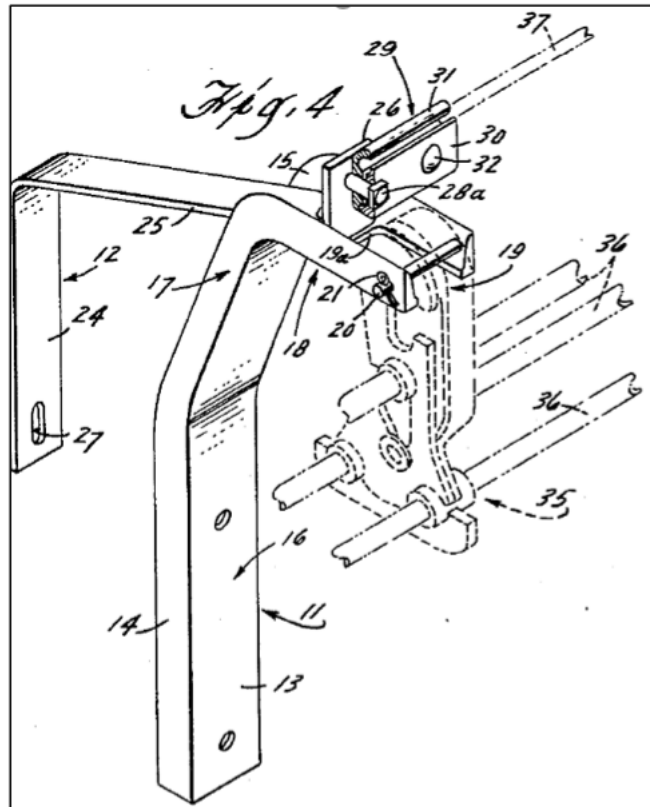


Id., FIG. 5; EX2064, ¶115.

Grushkowitz does not disclose a cable or wire that supports cable hangers and current wires, and that also serves as a grounding conductor. EX2064, ¶117; *see generally* EX1003.

D. PETERSEN U.S. PAT. NO. 3,001,749

Petersen issued September 26, 1961, and is titled “Pole Top Extension for Aerial Cable.” Petersen generally relates to pole top extensions for aerial conductors, and is directed specifically to a horizontally offset extension. EX1004, 1:9-21; EX2064, ¶119. The pole-top extension bracket includes two pieces: a channel support means (11), and a brace member (12). Petersen's pole-top extension is specially adapted to be affixed to the top of a wooden utility pole using through bolts (33) and (34) that extend through the pole and attach the brace member and channel support member to the pole. EX1004, 2:28-33; EX2064, ¶257. Petersen's pole-top extension addresses a need to obviate the use of crossarms in aerial cable suspension systems. *Id.*, 1:13-15; EX2064, ¶119.



EX1006, Fig. 4; 1:50-55.

Petersen's pole-top extension bracket supports an insulating aerial cable holder (35), shown holding three conductors in Figure 4. *Id.*, 2:41-47. Petersen's brace means 12 is formed of a strap material and is surmounted by a vertical extending end portion 26 "for supportingly engaging [a] *neutral messenger cable*." *Id.*, 2:1-8; EX2064, ¶121 (emphasis added). A "ground clamp means" comprised of "two clamping jaw members" that keep the neutral messenger wire in place is attached to the vertical extending portion. EX1006, 2:34-40.

Petersen recites a "neutral messenger wire clamp means" (*id.*, 3:33-34) and a "neutral messenger wire support" (*id.*, 4:6-7), but Petersen does not disclose that its

neutral messenger cable **37** supports cable hangers and electrical cables. *See generally* EX1006. Petersen's aerial cable holder **35** is supported on clevis **19**, which is part of the pole-top extension, and is separate and apart from neutral messenger cable **37**. *Id.*; *see also* EX2064, ¶¶122-123.

E. MACLEAN

MacLean Power Systems' "Pole Line Hardware Catalog" ("*MacLean*") is a catalog that includes the company's "standard line of Pole Line Hardware—those items commonly used by electric and telephone utilities and CATV systems." EX1027, 1. The catalog offers a thimble-eye bolt product, made of galvanized steel. EX1027, 14.

V. CLAIM CONSTRUCTION – “MULTI-FUNCTION LINE”

Independent claims 1 and 19 recite a “multi-function line.” The specification includes definitional language for this coined term. What constitutes a “multi-function line” was also an issue during prosecution. As understood by a POSITA in light of the claim language and intrinsic record, “multi-function line” means “a tension member that supports current wires and/or cable hangers, as a messenger wire, and which provides a current path, as a grounding conductor.” EX2064, ¶82.

This construction of “multi-function line” derives directly from the specification. First, the specification describes various conditions that require the use of a “grounding conductor,” including when a messenger wire, which is not

“structured to” (intended or designed to) carry current, nevertheless has current imposed on it, such as in the event of a lightning strike or failure of a current wire resulting in a fault. EX1001, 1:60-2:3. The specification makes clear what is meant by a “grounding conductor,” by referring to the prior art where “a conductor or grounding wire is disposed adjacent the messenger wires; *hereinafter, such a wire is identified as a ‘grounding conductor.’*” *Id.*, 1:67-2:3 (emphasis added).

The specification then goes on to explain:

Further, many regulations require that the grounding conductor be grounded at each pile. Presently, the grounding conductor is grounded by splicing a conductor, such as, but not limited to, a copper wire into the grounding conductor and coupling the copper wire into the grounding conductor and coupling the copper wire to a grounding cable or, if the piles are conductive, to each pile.

Id., 2:4-10.

It is not disputed that the purpose of a “grounding conductor” as defined by the specification is to provide an “effective ground fault current path.” *See, e.g.*, EX2064, ¶46; EX2004, 26:22-27:17. It is also not disputed that the “many regulations” referenced by the specification include the NEC. EX2064, ¶71; EX2004, 46:20-47:1, 10:17-21. And it is not disputed that an “effective ground fault current path” as defined by the NEC is an intentionally constructed path that facilitates the operation of the overcurrent protective device or ground-fault

detectors on high impedance grounded systems. EX2064, ¶46; EX2004, 27:18-28:9.

Immediately following the specification's discussion of the grounding conductor and splices of prior art systems, it describes the claimed grounding system of the '551 Patent, and defines "multi-function line":

The grounding system includes a multi-function line assembly and a number of conductive mounting assemblies. Each conductive mounting assembly is structured to be, and is, coupled to the multi-function line and to a conductive pile. This configuration provides a path to ground for a current in the multi-function line assembly. Further, the multi-function line supports the cable hangers (which support the current wires, data wires and other wires). That is, a single multi-function line *supports the cable hangers, as a messenger wire, and provides a current path, as a grounding conductor.* *Accordingly*, as used herein, a "multi-function line" means a tension member that supports current wires and/or cable hangers, and, which is conductive.

EX1001, 2:27-40 (emphasis added).

Petitioner's proposed construction for "multi-function line" is based entirely on the last sentence of the language quoted above: "a tension member that supports current wires and/or cable hangers and is conductive." Paper 1, 23-24; *see also*

EX1002, ¶69. Even within that single sentence, Petitioner ignores the word “Accordingly,” which invokes the language that precedes it. *See* EX2064, ¶89-90. Petitioner's proposed construction is consistent with its theory, throughout its Petition, that it only needs to point to metal parts connected to each other in order to disclose the “multi-function” limitation of the ‘551 Patent. But Petitioner's proposed construction is not consistent with or supported by the specification as a whole. Petitioner isolates a portion of a single sentence from the specification and ignores all the other language that makes clear that more is required to meet the “multi-function line” limitation than merely metal parts connected to each other.

Patent Owner's construction of “multi-function line,” on the other hand, is supported by the entirety of the specification's definitional language. In light of the specification's entire disclosure, a POSITA would understand that a “multi-function line” must be more than just conductive – it must act as a grounding conductor that provides an effective ground fault current path.

The parties further dispute what is meant by the term “tension member” within the construction of a “multi-function line.” Petitioner contends that “tension member” is simply something that is “under tension.” Paper 1, 3. According to Petitioner, therefore, a “multi-function line” is simply something that is under tension and that is made of a material capable of conducting electricity. *Id.*

Petitioner's construction of "tension member" is further inconsistent with the entirety of the specification. The plain and ordinary meaning of "tension member" used to describe the "multi-function line," as would be understood by a POSITA in light of the specification and prosecution history, is a cable or wire. EX2064, ¶91; *see also* Paper 21, 9. The '551 Patent defines "messenger wire" as "a robust cable," and states that the "multi-function line supports the cable hangers, *as a messenger wire.*" EX1001, 1:24-25, 2:35-37 (emphasis added). The multi-function line is further described throughout the '551 Patent as "copper wire or a copper cable, i.e., copper wires twisted together or about a copper core;" "a cable that includes conductive strands and non-conductive strands;" and as "strands ... selected from the group consisting of: copper strands, copper-clad steel strands, galvanized steel strands, a conductive alloy strands, partially conductive, alloy strands, or are a composite of strands." *Id.*, 8:60-62; *Id.*, 9:6-8; *Id.*, 9:12-16. The specification also describes the multi-function line as being "drawn taut." *Id.*, 7:17-23. A POSITA would understand from the specification, therefore, that a multi-function line consisting of a "tension member" is a flexible, cable or wire structure that can be stretched taut. EX2064, ¶93.

Petitioner's proposed construction of "tension member" also conflicts with the prosecution history. As summarized in Section III.B., the '668 Application that issued as the '551 Patent was rejected by the Examiner during prosecution over

Korman. EX1037, 124-133; *see also* EX2064, ¶94. The Examiner found that the weight of Korman's line "creates weight force which is pulling down on the line between connectors 42, 43 and this forms a tension line." EX1037, 131.

Ultimately, Applicant overcame this basis for rejection, and persuaded the Examiner that a "tension member" is something that is "substantially flexible," and "used to describe the 'multi-function line' which replaces the messenger wire used in the prior art." *Id.*, 173.⁵

In light of the '551 Patent's claim language, specification, and prosecution history, a POSITA would understand "a tension member" to be a cable or wire, and as such, a "multi-function line" is a cable or wire that not only supports cable hangers and current wires, but also acts as a grounding conductor to provide an effective ground fault current path.

⁵ Dr. Beik suggested for the first time that the reason Korman does not disclose the "multi-function line" limitation is that because its "pin 60" did not provide support functionality. EX2004, 159:3-13. Dr. Beik's proffered reason for why Korman did not meet the "multi-function line" limitation has nothing to do with the Examiner's ultimate decision.

VI. PETITIONER HAS NOT SHOWN BY A PREPONDERANCE OF THE EVIDENCE THAT ANY CHALLENGED CLAIM IS OBVIOUS

A. GROUND 1: GRUSHKOWITZ DOES NOT RENDER OBVIOUS CLAIMS 1-12, AND 18-19 OF THE '551 PATENT

1. Grushkowitz Fails to Disclose the “Multi-Function Line” and “A Number of Conductive Mounting Assemblies” Limitations of Claims 1-12 and 18

As discussed above, the recited “multi-function line” limitation is a *tension member* (i.e., a *cable or wire*) that supports current wires and/or cable hangers, as a messenger wire, and which provides a current path, as a grounding conductor.” In contrast, Grushkowitz discloses a *rigid* frame structure that consists of interconnected metal components, including cable trays, brackets, and conductive piles, and its support system is assembled with fasteners. EX2064, ¶¶114–117. Grushkowitz does not disclose a cable or wire that supports cable hangers and current wires (and that also serves as a grounding conductor).

As Dr. Phinney explains, a POSITA would understand that Grushkowitz's rigid cable tray structure is not a multi-function line that is a tension member as disclosed in the '551 Patent. *Id.*, ¶¶192–195. In addition, a POSITA generally would not describe a cable tray as a “tension member.” EX2064, ¶188.

Moreover, as discussed immediately above (Section V), the issue of whether a rigid structure, such as Grushkowitz's cable tray, meets the definition of a “multi-function line” was already considered and resolved during prosecution. Applicant

ultimately persuaded the examiner that Korman's pin 60 is a rigid construct, and thus not a tension member. The Board should reject the Petition's regurgitated invalidity arguments.

Petitioner's and Dr. Beik's analysis of dependent claim 7 further highlights the fallacy of their assertions and attempts at hindsight reconstruction. Specifically, claim 7 recites in relevant part that the "multi-function line coupling includes one of a clam-shell assembly, a split bolt, a U-bolt, or a lay-in lug assembly." EX1001, 12:41-43. Dr. Phinney explains that a split bolt is structured and intended to affix one or more cables. EX2064, ¶¶198–199. Nevertheless, Dr. Beik contends that a split bolt is capable of coupling Grushkowitz's tray and bracket. EX1002, ¶90; Petition, 40. Presumably, Dr. Beik proposes modifying Grushkowitz's cable trays to thread them through the split bolt recited in claim 7 – although he does not explain how or why any such modification would be accomplished. EX2064, ¶200. As Dr. Phinney explains, a POSITA would not find it obvious to affix a tray and bracket together with a split bolt (adapted to affix cables), rather than with Grushkowitz's nuts, bolts, or rivets. *Id.*, ¶201.

Finally, neither the Petition nor Dr. Beik proposes a modification of Grushkowitz to replace its cable trays with a tension member let alone how or why a POSITA would make any such modification. Accordingly, Grushkowitz neither discloses nor renders obvious the claim limitation "a multi-function line."

Next, the claims further recite “conductive mounting assemblies . . . **structured to be** coupled to said multi-function line” EX1001, 12:17-19 (emphasis added). The specification of the ‘551 Patent specifically defines what “structured to” followed by a verb means:

As used herein, “structured to [verb]” means that the identified element or assembly has a structure that is shaped, sized, disposed, coupled and/or configured to perform the identified verb. . . . Further, as used herein, “structured to [verb]” means that the identified element or assembly **is intended to, and is designed to, perform the identified verb**. Thus, an element that is merely capable of performing the identified verb but which is not intended to, and is not designed to, perform the identified verb is not “structured to [verb].”

EX1001, 3:36-50 (emphasis added). Thus, each of the claimed conductive mounting assemblies must be configured, intended, and designed to be coupled to the multi-function line. *See* EX2064, ¶¶212–213. Because Grushkowitz does not disclose or suggest a multi-function line, it follows that the structures that Dr. Beik identifies in Grushkowitz (EX1002, ¶71) cannot satisfy this claim limitation, since those structures are not configured, intended, or designed to be coupled to (an absent) multi-function line. *See* EX2064, ¶¶214–215.

Additionally, because Grushkowitz neither discloses nor suggests the claimed “multi-function line” or “conductive mounting assembly,” it also follows that Grushkowitz does not disclose the limitation “said multi-function line

assembly [including a multi-function line] is coupled to, and in electrical communication with, said number of conductive mounting assemblies.” EX1001, 12:21-23; EX2064, ¶217.

2. Grushkowitz Fails to Disclose the “Multi-Function Line” and “Multi-Function Line Couplings” Limitation of Claim 19

For the same reasons discussed above regarding claims 1-12 and 18, Grushkowitz does not disclose or render obvious the claimed “multi-function line.” EX2064, ¶¶220-221. Likewise, because Grushkowitz does not disclose the multi-function line, Grushkowitz does not disclose claimed “multi-function line couplings *structured to be* [i.e., configured, designed, or intended to be] coupled to said multi-function line.” Additionally, Grushkowitz fails to disclose or render obvious the limitation “wherein, when said multi-function line assembly is coupled to, and in electrical communication with said multi-function line couplings, each said multi-function line coupling defines a conductive path.” *Id.*, ¶¶221–222.

Lastly, Dr. Beik again fails to explain how or why a POSITA would be motivated to modify Grushkowitz. *See* EX1002, ¶¶102, 104, 106. Nor does he offer any support that Grushkowitz could be modified with any reasonable expectation of success in achieving the invention of the ‘551 Patent. EX2064, ¶223.

B. GROUND 2: THE CAB WEBSITE AND CAB WHITEPAPER DO NOT RENDER OBVIOUS CLAIMS 1-19 OF THE '551 PATENT

1. CAB Website and CAB Whitepaper Fail to Disclose “Multi-Function Line” Or “A Number Of Conductive Mounting Assemblies ... Structured To Be Coupled To A Multi-Function Line” Limitations of Claims 1-18

There are a number of reasons, all supported by Dr. Phinney, why a POSITA *would not* have understood the CAB Website or the CAB Whitepaper to disclose the claimed invention simply because the references disclose metal parts in contact with each other, or simply because the references do not show a separate grounding conductor from the depicted messenger wire. *See generally* EX2064, ¶¶133-179.

i. CAB Website and CAB Whitepaper do not disclose a grounding system

The assertion by Petitioner in its Petition, and by Dr. Beik in his Declaration, that the CAB Website and CAB Whitepaper disclose the claimed “grounding system” can be reduced to this: a metal messenger wire that is attached to metal clamps and metal piles —i.e., metal-to-metal contact—achieves the claimed grounding system “because all of the components are in contact with each other and are made of metal which is conductive.” EX1002, ¶¶108, 115; Paper 1, 49, 53.

The assertion by Petitioner and Dr. Beik that the CAB Website's depiction of metal parts connected together, without more, sufficiently shows a grounding system (Paper 1, 49; EX1002, ¶108) is flawed.

First, the CAB Website discloses nothing about any kind of grounding system – from the face of it, that was clearly not its purpose. The CAB Website, titled “CAB Cable Rings and Saddles for Solar Cable Management,” is only directed to providing information about the Cable Rings and Saddle hangers. EX1005, 1. It only shows those hangers, suspended from what is depicted to be a messenger wire, supporting what is depicted as electrical cables. It only links to product data and sales information related to CAB's hangers. *Id.*, 5. *See also* EX2064, ¶¶106-107. A POSITA viewing the CAB Website would not even be thinking about a grounding system, and would not have found anything on any of the website links to any components of a grounding system.

Second, a POSITA would not simply look at a website image that depicts metal components connected to each other and assume that it depicts a grounding system. Dr. Beik acknowledged this in his deposition, that before he could conclude that metal parts connected together were sufficient to provide an effective ground fault current path, he would need more information – information that the CAB Website does not contain. *See generally* EX2064, ¶¶138-141. Dr. Beik agreed that he “would not know” whether “metal components that are simply connected

together [are] enough by themselves to provide an effective ground fault current path.” EX2004, 24:5-9. He continued, “[t]o provide an effective ground path one must take into account—the POSITA would take into account from the element to the endpoint all the conductive path, the [electrical] resistance, the connection, mechanical strength, and so on.” *Id.*, 24:14-18. And that is just some of the information that a POSITA would need before they could conclude that the CAB Website discloses the claimed grounding system. *Id.*, 24:19-24; EX2064, ¶¶138-139.

In similar fashion, Dr. Beik testified that he would “have no way of verifying” whether even “a metal pile, without anything else, that’s imbedded in the earth would . . . be considered to be grounded.” EX2004, 17:13-16. Dr. Beik stated that he would need additional information, such as “the resistance of the earth, the humidity, the resistance of the [pile] the dimension of the [pile] [and] all the details that [would] allow[] [him] to calculate what would be the specification while in the ground.” EX2004, 17:18-22. Ultimately, he conceded it to be “a fair statement” that “simply looking at a metal pile that’s imbedded in the earth, without knowing all of this other information . . . [would not be enough for him

know] whether it was sufficient to ground the metal pile just by virtue of it being imbedded in the earth.” *Id.*, 17:18-18:4; EX2064, ¶141.⁶

In fact, as Dr. Phinney and Mr. Brooks have testified in their Declarations, a POSITA would not have assumed that the CAB Website's and CAB Whitepaper's depiction of the mounting hardware components that connect the “messenger wire” to the pile are properly bonded as shown. EX2064, ¶146; EX2033, ¶61. The references contain no indication or suggestion that the support for affixing the depicted messenger wire to the pile is suitable for bonding. *Id.* It is insufficient to show that mounting hardware is metallic, or that there are metal-to-metal connections between the messenger wire and its supports. What must be shown is that these components are properly bonded, and a POSITA would need to confirm—not merely assume—whether the components are properly bonded. EX2064, ¶¶146-147; EX2033, ¶61.

⁶ Moreover, a POSITA would know that support equipment such as metal piles would not be grounded simply by virtue of being embedded into the earth, but rather are (i.e., must be) grounded by being connected through a grounding conductor to the electrical-system ground at the inverter. EX2064, ¶142. Dr. Beik acknowledged that the earth may not be used as the sole EGC or ground fault current path in a grounding system. EX2004, 26:16-21.

- ii. The CAB Website and CAB Whitepaper do not disclose a multi-function line

For the claimed “multi-function line,” Petitioner and Dr. Beik simply point to the depiction in the CAB Website and CAB Whitepaper of a “messenger wire” that “appears to be made from galvanized steel,” which conducts current, and is attached to spaced piles. EX1002, ¶¶113-115; Paper 1, 51-54. Again, for this limitation, Petitioner and Dr. Beik merely rely on what they perceive to be a metal messenger wire connected to other metal parts, enough to disclose the claimed “multi-function line.”

Subsequently, in his deposition, Dr. Beik appears to have pivoted from his “metal-to-metal” theory that he espoused in his Declaration. As set forth in Section VI.B.1.i above, Dr. Beik now concedes that the claimed multi-function line must, in addition to supporting cable hangers, be a grounding conductor that provides an effective ground fault current path. EX2004, 22:6-23:24, 67:10-68:12, 148:5-9; *see also* EX2064, ¶84. Dr. Beik, nevertheless, assumes that a POSITA would have understood that the CAB Website and CAB Whitepaper disclose the depicted messenger wire acting as a grounding conductor because no other grounding conductor is shown. EX2004, 103:9-104:6. This assumption is equally flawed for multiple reasons.

First, Dr. Beik assumed, without evidence, that the CAB Website depicted a “professional installation” of CAB’s hangers suspended from a messenger wire.

From there, he looked for a grounding conductor, and found none. He thus concluded that a POSITA at the time of the invention would have concluded that the messenger wire must be the grounding conductor that provides the effective ground fault current path:

A POSITA would know this professional installation would require a grounding system. A POSITA would see that there are *no other grounding system in this than that messenger wire*, which *appears* to be galvanized steel or some sort of steel, conductive through conductive brackets or mounting assembly through conductive piles. A POSITA would conclude this is a grounding system *in the absence of everything else*.

EX2004, 103:9-104:6 (emphases added). In other words, Dr. Beik relies on the absence of evidence as evidence of what must be.

Contrary to Dr. Beik's assumption, as the Declarations of Mr. Smith and Mr. Brooks confirm, the installation of CAB's hangers suspended from a messenger wire, and the messenger wire connected to a metal pile, is, in fact, not a professional or functional installation – it was a mock-up put together for marketing purposes, i.e., to include on CAB's Website. EX2061, ¶¶14-19; EX2033, ¶¶56-62. And importantly, there are multiple red flags that would have so indicated to a POSITA. Notably, it is apparent that the images in the CAB Website and CAB Whitepaper depict the messenger wire and hangers running *parallel* to

the solar panels. A POSITA familiar with the limited use of above-ground messenger wire supported cable management systems at the time of the CAB Website and CAB Whitepaper would have known that the messenger wire and cable hangers would have run *perpendicular* to the solar panels, and the end of the rows of panels and running along the “home run” between one row and another. EX2064, ¶145; EX2033, ¶60; EX2061, ¶17.

In addition, a POSITA would have had reason to be dubious about whether the support for affixing the depicted messenger wire to the metal pile is suitable for grounding. EX2064, ¶146; EX2033, ¶61. A POSITA certainly would not have been surprised to learn that this whole setup was “jerry-rigged” with wire rope, makeshift pipe clamps and studs to attach the wire-rope to the piles. EX2061, ¶16; EX2033, ¶59; *see also* EX2064, ¶144, n.5.

Perhaps most importantly of all, a POSITA would have had no reason to assume that the messenger wire was acting as a grounding conductor simply by virtue of the fact that no separate conductor was shown. Prior to the time of the ‘551 invention, the use of a messenger wire to serve as a grounding conductor while also supporting cable hangers and current wires was not even known. EX2064, ¶148. As Dr. Phinney has explained, the prior art references cited by Dr. Beik in his Declaration do not support the assertion that the benefits of using a messenger wire not only as a support structure but also to serve simultaneously as

a grounding conductor were well known. *See* EX1002, ¶¶47, 50-52; Paper 1, 11-12. Specifically, as explained by Dr. Phinney, and as Dr. Beik agreed, the “neutral messenger” disclosed in the Southwire triplex service drop cable (EX1023) does not serve as a grounding conductor, since a neutral messenger wire lashed with phase conductors acts as a neutral conductor that is intended to carry current under normal conditions, where a grounding conductor is only intended to carry current in the event of a fault condition. EX2064, ¶¶150-152, 239-241.

The same is true for the “neutral messenger cable” disclosed in Petersen (EX1004), and the “system neutral” messenger wire disclosed in Hendrix (EX1024). These neutral conductors do not and cannot act as grounding conductors. EX2064, ¶¶235-245.⁷

Petitioner has offered no evidence that, at the time of the invention, it was known to use a messenger wire that served the dual purpose of supporting cable hangers and current wires and providing an effective ground fault current path as a

⁷ Petitioner and Dr. Beik also cite to Williams (EX1020) as an example of a messenger wire used as a grounding conductor. As Dr. Phinney explains, Williams discloses a fixture to make it impossible for a lineman to stand on a grounded messenger cable, so as to prevent injury or death – nothing about a grounding conductor. EX2064, ¶154.

grounding conductor. Consequently, there would have been no basis for a POSITA viewing the CAB Website and CAB Whitepaper at the time of the invention to have assumed the cable depicted as a messenger wire would also have been the EGC, simply because a separate grounding conductor is not disclosed. EX2064, ¶¶156-159. As Mr. Brooks, who has decades of experience in the solar industry, has confirmed, no POSITA would look at the image included in CAB's website and assume that the purported messenger wire connected to metal hardware and a metal pile is acting as a grounding conductor, simply because a separate grounding conductor is not shown. EX2033, ¶¶57-62. As Dr. Beik has acknowledged, a POSITA must know additional information such as the resistance, connection, mechanical strength, and other factors. EX2004, 24:14-18.

Finally, the CAB Whitepaper's reference to "grounded steel messenger wire" gives no further suggestion to a POSITA of a grounding conductor that provides an effective ground fault current path. As Mr. Brooks, the author of the CAB Whitepaper has explained, this reference to a "grounded steel messenger wire" was in the context analyzing whether CAB's metallic cable rings and saddles would be required to be listed for bonding and grounding. He was merely explaining that no such listing would be required, since even if the insulation on the electrical cables supported by the hangers were to be damaged, the hangers would remain at or near ground potential because they were in full contact with the

messenger wire, *which itself would be grounded*. EX2033, ¶63. The grounded messenger wire, however, is not the grounding conductor – in fact, the grounded messenger wire is grounded by a separate grounding conductor. *Id.* A person with the defined level of skill of a POSITA would not understand the CAB Whitepaper to be disclosing the use of the messenger wire as a grounding conductor. *Id.*, ¶64; *see also* EX2064, ¶¶160-168.⁸

- iii. CAB Website and CAB Whitepaper do not disclose the claimed “number of conductive mounting assemblies”

Claim 1 recites “a number of conductive mounting assemblies, each said conductive mounting assembly *structured to*, i.e., intended and designed to, be coupled to said multi-function line. . . .” EX1001, 3:36-50, 12:17-20; EX2064, ¶172.

Petitioner and Dr. Beik argue that this claim limitation is met by the CAB Website's depiction of “metal mounting assemblies,” and by “a nearly identical photo of a conductive mounting assembly” in the CAB Whitepaper. Paper 1, 54-55, EX1002, ¶117. They argue that the depicted mounting assemblies “appear to be

⁸ Contrast the language used by Mr. Brooks in a later whitepaper from November 2020 when he specifically described CAB's grounding messenger wire that had been certified as “both an equipment grounding conductor (EGC) and grounding electrode conductor (GEC)”. EX2037, 12.

comprised of galvanized steel,” and “structured to couple a multi-function line to a pile that appears to be made from galvanized steel.” Paper 1, 54; EX1002, ¶117. In other words, Petitioner and Dr. Beik once again advance their argument that this claim limitation is met based on metal parts connected together.

However, because the conductive mounting assemblies are intended and designed to be coupled to the multi-function line, a POSITA would understand that they, too, must be sufficiently conductive so that, when coupled to the multi-function line, an effective ground fault current path is provided. EX2064, ¶174. Since the CAB Website and CAB Whitepaper do not disclose or render obvious a “multi-function line,” it follows that the structures that Dr. Beik identifies as the “conductive mounting assemblies” cannot satisfy this claim limitation, since there is no disclosure that those structures are configured, intended or designed to be coupled to a multi-function line so as to provide an effective ground fault current path. EX2064, ¶175. Accordingly, the CAB Website and CAB Whitepaper do not disclose the limitation of claim 1 reciting “a number of conductive mounting assemblies, each said conductive mounting assembly structured to be coupled to said multi-function line.” EX2064, ¶176.

Furthermore, because the CAB Website and CAB Whitepaper fail to disclose or render obvious the claim limitations “a multi-function line assembly including a multi-function line,” and “a number of conductive mounting

assemblies, each said conductive mounting assembly structured to be coupled to said multi-function line,” it follows that the references fail to disclose or render obvious the final limitation of claim 1, “said multi-function line assembly is coupled to, and in electrical communication with, said number of conductive mounting assemblies.” EX2064, ¶177.

Dependent claims 2-18 depend from claim 1 and require its limitations. Because the CAB Website and CAB Whitepaper do not disclose or render obvious the limitations of claim 1, they cannot disclose or render obvious these dependent claims. EX2064, ¶178.

Separately, dependent claim 2 recites “a number of multi-function line couplings,” which are components of the conductive mounting assembly. EX1001, 12:24-29. Because the CAB Website and CAB Whitepaper fail to disclose the claimed conductive mounting assemblies of claim 1, the references cannot satisfy the limitation of claim 2 that requires the multi-function line couplings to define an effective ground fault current path. EX2064, ¶179.

2. The CAB Website and CAB Whitepaper Do Not Disclose The Limitations of Claim 19

As explained above, the CAB Website and CAB Whitepaper fail to disclose or render obvious a “multi-function line assembly with a multi-function line.” Accordingly, the CAB Website and CAB Whitepaper fail to disclose or render obvious a mounting assembly for a grounding system that includes a multi-

function line assembly with a multi-function line. *See generally* EX2064, ¶¶180-186.

Dr. Beik contends that the CAB Website's and CAB Whitepaper's depiction of a clamp that connects the messenger wire to a vertical pile satisfies the limitations "a number of multi-function line couplings," and "each said multi-function line couplings structured to be coupled to said multi-function line." EX1002, ¶182. As explained above, however, what is depicted in the references as a messenger wire is not a "multi-function line assembly including a multi-function line." EX2064, ¶183. Moreover, because the claimed multi-function line couplings are intended and designed to be coupled to the multi-function line, a POSITA would understand that the couplings must be sufficiently conductive so that, when coupled to the multi-function line, an effective ground fault current path is provided. *Id.* It follows, therefore, that because the CAB Website and CAB Whitepaper do not disclose the claimed multi-function line, the clamp identified by Dr. Beik as connecting the messenger wire to a pile does not satisfy the multi-function line couplings limitation. *Id.*

Because the CAB Website and CAB Whitepaper fail to disclose or render obvious the multi-function line assembly with a multi-function line and the multi-function line couplings, it follows that the CAB Website and CAB Whitepaper fail to disclose or render obvious the limitation "wherein, when said multi-function line

assembly is coupled to, and in electrical communication with said multi-function line couplings, each said multi-function line coupling defines a conductive path.”

EX2064, ¶184.

Finally, for the same reasons explained above with respect to dependent claim 2, the CAB Website and CAB Whitepaper do not disclose or render obvious a multi-function line coupling that is designed or intended to provide an effective ground fault current path for a grounding conductor. EX2064, ¶185.

3. Petitioner Has Not Demonstrated A POSITA Would Have Been Motivated to Combine the CAB Website And CAB Whitepaper, Or That A POSITA Would Have Had A Reasonable Expectation Of Success In Doing So

Petitioner has insufficiently articulated a motivation to combine the CAB Website and CAB Whitepaper simply because “both references are concerned with the same subject matter (cable management systems for solar arrays), discuss the same company’s products, and because the CAB Website expressly references by name and date, excerpts from, and encourages CAB Website visitors to download the CAB Whitepaper. . . .” EX1002, ¶168; *see also* Petition, 47-48. However, similarity in subject matter is insufficient, by itself, to establish that a POSITA would have been motivated to combine references. *Microsoft Corp. v. Enfish, LLC*, 662 F. App’x 981, 990 (Fed. Cir. 2016) (unpublished)

Moreover, Petitioner insufficiently articulates *why* a POSITA would combine the references, articulates no specific combination, or *how* a POSITA

make that combination. In fact, Dr. Beik's opinion appears not to even be based on a combination. Rather, Dr. Beik opines that each of the CAB Website and CAB Whitepaper discloses each of the elements of the claimed invention. EX1002, ¶¶112, 116, 119, 120, 121; *see also* EX2004, 101:5-19. Nowhere does Dr. Beik purport to combine the CAB Website with the CAB Whitepaper in a way that one reference provides a limitation not met by the other reference.

Accordingly, Petitioner has not sufficiently articulated reasons, with rational underpinnings, as to why or how a POSITA would combine the CAB Website with the CAB Whitepaper with a reasonable expectation of success in achieving the claimed invention.

C. GROUND 3: PETERSEN, ALONE, OR IN VIEW OF THE KNOWLEDGE OF A POSITA DOES NOT RENDER OBVIOUS CLAIMS 1-19 OF THE '551 PATENT

1. Petersen Fails to Disclose the Grounding System Recited In Claims 1-18

The assertion that Petersen discloses the claimed grounding system is premised on Petersen's use of the term "ground clamp means," and what that term "implies" to Dr. Beik. Paper 1, 71; EX1002, ¶170. Specifically, what the term "ground clamp means" implies to Dr. Beik is that "the neutral messenger and pole top extension are coupled with the clamp means in order to provide a ground-path for any stray electrical current." EX1002, ¶170; Paper 1, 71. Petitioner's and Dr. Beik's assertion, however, ignores that the "ground clamp means" is used to

“confine and keep a *neutral messenger cable 37* in tight supported engagement therewith.” EX1004, 2:36-40 (emphasis added); EX2064, ¶247. Contrary to Dr. Beik's assertion (EX1002, ¶57), Petersen says *nothing* about keeping the neutral messenger wire in place and in a grounded electrical communication. EX2064, ¶247.

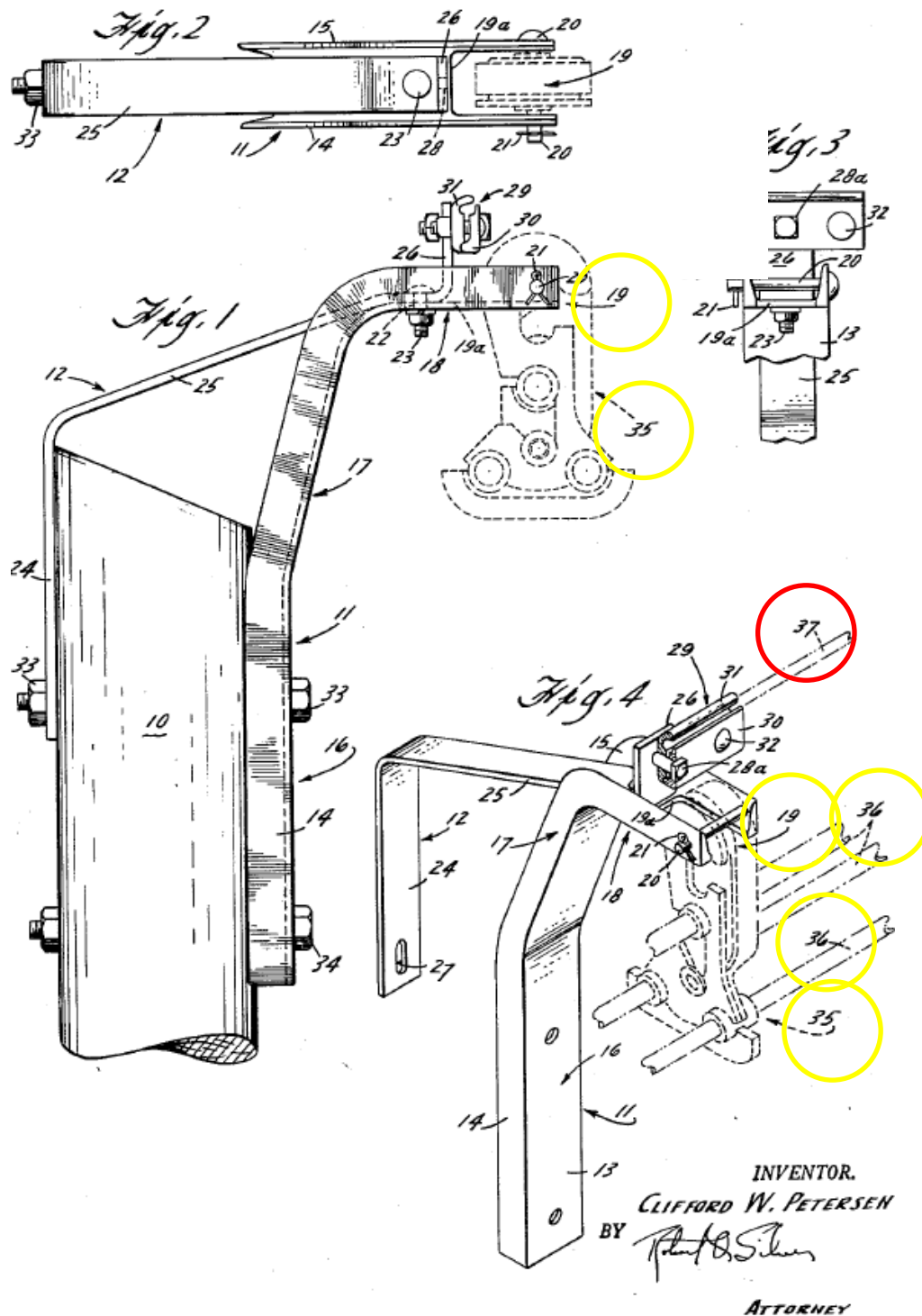
Continuing with the theme that metal parts connected together are sufficient to disclose a grounding system, Petitioner and Dr. Beik conclude by asserting that the parts of Petersen's assembly are metallic and therefore conductive. Paper 1, 72; EX1002, ¶172. As set forth above with respect to Ground 2, more is required to establish a grounding system than metal parts connected together. In fact, Petersen is simply directed to a two-piece pole-top mounting bracket for the top of a wooden utility pole, and is not related to, nor does it disclose, anything about a grounding system. Petersen says nothing whatsoever from which a POSITA could arrive at any conclusion about any type of grounding system.

2. Petersen Does Not Disclose The Claimed “Multi-Function Line”

a. Petersen Does Not Disclose A Multi-Function Line That Supports Cable Hangers and Current Wires as a Messenger Wire

Petitioner and Dr. Beik assert that Petersen's “neutral messenger cable” is subjected to tensile forces as a result of gravity and the weight of current wires and/or cable hangers supported thereon, *and is thus a tension member and multi-*

function line. Paper 1, 73; EX1002, ¶¶173-174. Petersen, however, discloses nothing about its neutral messenger cable supporting anything, and certainly not cable hangers and current wires. EX2064, ¶¶226. As shown below in Petersen's Figures 1 and 4 aerial cable holder **35** (adapted to hold the three conductors **36** in spaced relation (EX1004, 2:41-47)) is *not* supported by the neutral messenger cable **37**, but rather is supported by, and attached to, clevis **19**. EX1004, 2:41-47, 56-58; EX2064, ¶228. Petersen's neutral messenger cable **37**, therefore, does not support either cable hangers or current wires, and for this reason alone is not a multi-function line. EX2064, ¶229.



Id., 1:62-64, 2:56-58; see also EX2064, ¶228.

In his deposition, apparently recognizing that Petersen does not disclose a messenger wire that supports cable hangers and current wires, Dr. Beik offered a

new argument not raised in his Declaration, nor in the Petition. He testified simply that “a POSITA would know” that neutral messenger cable **37** would support cables with a “hanger type” in the spans between poles. EX2004, 136:22-137:2, 137:21-138:10. Dr. Beik offered no objective evidence to support his new – and untimely disclosed – opinion. *See* 37 C.F.R. §42.65(a); CTPG, 73.

Petersen makes no disclosure of the need for any additional support of current wires between poles, let alone support using cables hangers suspended from the neutral messenger cable **37**. Dr. Beik could only offer that “a POSITA would know.” EX2004, 138:5-6, 9-10, 139:6-13, 141:1-13. Dr. Beik seems to opine that the need for additional support of the current wires between poles is inherently necessary. Dr. Beik conceded, however, that the need to support cables between poles would depend, at least in part, on the span between poles. EX2004, 140:18-22. When asked whether he was aware of any instances where conductors supported at the pole (such as by Petersen's aerial cable holder **35**) had not been further supported in the span between poles, he could only answer “I do not know,” and the best he could do was to point to the image included in the CAB Website (EX1005). *Id.*, 141:14-23; *see also* EX2064, ¶¶231-234. Dr. Beik's unsupported opinion amounts to nothing but speculation and cannot be sufficient to sustain Petitioner's burden. 37 C.F.R. § 42.65(a).

b. Petersen Does Not Disclose A Multi-Function Line That Serves As A Grounding Conductor

Petersen fails to disclose a multi-function line because its neutral messenger cable **37** does not serve as a grounding conductor. *See generally* EX2064, ¶235-245. Specifically, Petersen's neutral messenger cable is a "grounded conductor," defined in the NEC as a system or circuit conductor that is intentionally grounded. EX1007, 31; EX2064, ¶236. It is also a "neutral conductor," which the NEC defines as a conductor "*intended to carry current under normal conditions.*" EX1007, 32; EX2064, ¶237 (emphasis added). One or more phase conductors (which supply electrical power) run with a neutral conductor, which carries the unbalanced current of the phases and acts as the "return leg" of a circuit. EX2064, ¶¶237-238. The neutral conductor is required by the NEC to be separately grounded. EX1007, 31; EX2064, ¶236. The neutral conductor is grounded by being connected to a grounding electrode through a GEC, which is a type of grounding conductor. EX2064, ¶¶43-44, 236.

A POSITA would understand that a neutral messenger cable can provide a support function in addition to serving as a neutral conductor. EX2064, ¶239. An example is the Southwire tri-plex service-drop cable (EX1023), where the neutral messenger is bundled with the phase conductors. EX2064, ¶239. Because the neutral messenger is intended to carry current to complete the circuit, however, and is thus part of the circuit, it cannot also act as a grounding conductor, which is only

intended to carry current under an abnormal fault condition. EX2064, ¶240; *see also* EX2004, 48:3-4 (Dr. Beik agreeing that “[n]o grounding system is intended to carry current under normal conditions.”).

Dr. Beik's interpretation of NEC Article 396.30 (EX1007, 241) that a neutral conductor may also serve as a grounding conductor (EX1002, ¶¶49-50) is incorrect. Dr. Beik fails to appreciate that subparagraph (B), referring to neutral conductors, and subparagraph (C), referring to EGC's, are mutually exclusive. EX2064, ¶242. That is, these provisions do not authorize a neutral conductor to “double” simultaneously as an EGC. EX2064, ¶¶242-243.

Dr. Beik nevertheless persisted during his deposition that Petersen's neutral messenger cable must be acting as a grounding conductor “[i]n the absence of any other ground or ground system” shown in Petersen, a POSITA would understand that the neutral messenger **37** “is acting as a grounding conductor.” EX2004, 145:21-25. Once again, Dr. Beik attempts to prove a disclosure by what is not disclosed. As stated above, Petersen is directed to a pole-top extension and is not related in any way to a grounding system. A POSITA would not expect that a reference that is directed to one invention will disclose features of an unrelated invention. EX2064, ¶¶249-250.

A POSITA would understand that Petersen's neutral messenger cable **37** is not a grounding conductor. For this separate reason alone, Petersen does not

disclose the claimed multi-function line. *Id.*, ¶251.

3. Petersen Does Not Disclose The Claimed “Number of Conducting Mounting Assemblies” Or Conductive Piles

Claim 1 of the ‘551 Patent further requires conductive mounting assemblies “structured to” (intended and designed to) be coupled to the multi-function line. Dr. Beik identifies Petersen’s pole-top extension “comprised of ‘metallic parts’” as satisfying this claim limitation. EX1001, 3:36-50; EX1002, ¶175. Whatever metallic parts may be disclosed in Petersen, they are not “structured to” be coupled to the claimed multi-function line. Petersen does not disclose or suggest a multi-function line, and so its pole-top extension cannot be configured, intended or designed to be coupled to an absent multi-function line. EX2064, ¶255.

Contrary to Petitioner’s and Dr. Beik’s assertion (EX1002, ¶172; Paper 1, 74), Petersen does not disclose spaced conductive piles as recited in claim 1. *See generally* EX2064, ¶256-257. Petersen consistently refers to the invention as an extension, or bracket, mounted on a “pole-top” or “utility pole” (EX1004, 1:2-10), and Figure 1 of Petersen depicts the pole as wooden, which are not conductive. EX2064, ¶256; *see also* EX1004, 2:28-33. Dr. Beik does not disagree that Petersen’s utility pole is wooden. EX1002, ¶172 (indicating that Petersen discloses a “wood structure[]”).

Dr. Beik asserts that a POSITA would replace Petersen’s wooden pole with a metallic pile because the latter “are easier and less expensive to handle and

install” than wood. EX1002, ¶172. That argument ignores that Petersen’s pole-top extension is specially adapted to be affixed to the top of Petersen’s wooden pole. *See* EX1004, 1:50-55; *see also, id.* 2:28-33 (“Suitable through bolts 33 and 34 extend through the pole and fixedly attach the brace member and the channel support member to the pole”); EX2064, ¶257. Dr. Beik offers no modification of Petersen’s pole-top extension to make it compatible with a metal pile, with any reasonable expectation of success in doing so. EX2064, ¶257.

Because Petersen does not disclose or suggest a conductive pile, its pole-top extension is not “structured to be coupled to . . . a conductive pile.” EX2064, ¶258.

Additionally, because Petersen fails to disclose or render obvious the limitations addressed above, Petersen fails to disclose or render obvious the final limitation of claim 1 of “said multi-function line assembly is coupled to, and in electrical communication with, said number of conductive mounting assemblies.” EX2064, ¶259.

Because dependent claims 2-18 depend from claim 1, and claim 1 is not obvious over *Petersen*, the reference does not disclose or render obvious these dependent claims. EX2064, ¶260.

Separately for claim 2 because Petersen fails to disclose or render obvious the limitation “a number of conductive mounting assemblies,” Petersen cannot disclose the limitations of dependent claim 2 that recites “a number of multi-

function line couplings,” which are part of the conductive mounting assemblies, let alone the additional limitation “each said multi-function line coupling defines a conductive path.” EX2064, ¶263.

4. Petersen Does Not Disclose the “Mounting Assembly” Limitations of Independent Claim 19

For the reasons stated above, Petersen does not disclose or render obvious a “multi-function line assembly with a multi-function line.” It follows, therefore, that Petersen’s ground clamp means 29 fails to disclose or render obvious the claimed multi-function line couplings *structured to be* (i.e., configured, designed or intended to be) coupled to a multi-function line. EX2064, ¶¶267-268.

Likewise, as discussed above, Petersen fails to disclose or render obvious a conductive pile. Therefore, it follows that Petersen’s through bolts 33 and 34 fail to disclose or render obvious the claimed support couplings *structured to be* (i.e., configured, designed, or intended to be) coupled to a conductive pile. *Id.*, ¶269. Additionally, because Petersen fails to disclose or render obvious the multi-function line assembly with a multi-function line and the multi-function line couplings, Petersen also fails to disclose or render obvious the limitation “wherein, when said multi-function line assembly is coupled to, and in electrical communication with said multi-function line couplings, each said multi-function line coupling defines a conductive path.” EX2064, ¶270.

Moreover, Petitioner and Dr. Beik again fail to propose any modification of Petersen let alone any explanation as to why a POSITA would be motivated to modify Petersen to achieve the invention of claim 19 with a reasonable expectation of success. *Id.*, ¶272.

Finally, Petitioner improperly incorporates by reference Dr. Beik's substantive arguments concerning claim 19. *Compare* Paper 1, 85-86 with EX1002, ¶¶207-213. Petitioner's challenge to this claim should be rejected on that basis alone. 37 C.F.R. § 42.6(a)(3). Thus, Petitioner has failed to prove by a preponderance of the evidence that claim 19 is obvious over Petersen.

D. GROUND 4: PETERSEN AND MACLEAN, ALONE OR IN VIEW OF THE KNOWLEDGE OF A POSITA, DOES NOT RENDER OBVIOUS CLAIMS 13-17 OF THE '551 PATENT

Claims 13 through 17 each depend indirectly from claim 1. Because *Petersen* does not render Claim 1 obvious, its combination with *MacLean* cannot render claims 13 through 17 obvious. EX2064, ¶¶274-275. Even if *Petersen* rendered Claim 1 obvious, *MacLean* would not render obvious Claims 13 through 17. *See generally* EX2064, ¶276.

Claim 13 recites the additional limitation of a “conductive thimble eye” included in the claimed grounding system. Claims 14 recites the additional limitation “wherein said multi-function line is structured to be operational with solar electrical equipment.” Claims 15 and 16 add limitations relating to the

absence of grounding splices. Claim 17 adds a limitation regarding the composition of the multi-function line. EX1001, 12:65-13:12.

Petitioner and Dr. Beik rely on MacLean solely for the disclosure of the “conductive thimble eye” limitation included in claims 14-17 by virtue of their dependency from claim 13. *See* Paper 1, 87-88; EX1002, ¶¶214-215. Neither Dr. Beik nor Petitioner, however, provide analysis or argument addressing how Petersen in view of MacLean disclose the additional limitations of claims 14-17. *See* EX1002, ¶218; Paper 1, 89; *see also* 37 C.F.R. § 42.6(a)(3). While Dr. Beik states that those limitations would have been supplied by “a POSITA’s knowledge,” he offers no evidence to support his bald assertion. 37 C.F.R. § 42.65(a).

E. GROUND 5: THE CAB WEBSITE, IN VIEW OF THE CAB WHITEPAPER AND FURTHER IN VIEW OF MACLEAN, DOES NOT RENDER OBVIOUS CLAIMS 13-17 OF THE ‘551 PATENT

The dependencies of claims 13-17 and their additional limitations are discussed *supra* (Section VI.E.). For the reasons explained above (Section VI.B.), the CAB Website and CAB Whitepaper do not render obvious independent claim 1, and therefore do not render obvious dependent claim 12. For at least the same reasons, the CAB Website, CAB Whitepaper, and MacLean in view of the knowledge of a POSITA do not render obvious claim 13.

Petitioner and Dr. Beik rely on MacLean solely for the disclosure of the “conductive thimble eye” limitation included in claims 14-17 by virtue of their dependency from claim 13. *See* Paper 1, 90-91; EX1002, ¶¶222-223. Neither Dr. Beik nor Petitioner, however, provide analysis or argument addressing how the CAB Website or CAB Whitepaper in view of MacLean disclose the additional limitations of claims 14-17. *See* EX1002, ¶218; Paper 1, 92; *see also* 37 C.F.R. § 42.6(a)(3). While Dr. Beik states that those limitations would have been supplied by “a POSITA’s knowledge,” he offers no evidence to support his bald assertion. 37 C.F.R. § 42.65(a).

F. OBJECTIVE EVIDENCE OF NON-OBVIOUSNESS FURTHER SUPPORTS THAT THE ‘551 PATENT’S CLAIMS ARE VALID

Objective indicia of nonobviousness (“secondary considerations”) include long-felt but unsolved need, commercial success, copying, industry praise, and expert skepticism. *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1379 (Fed. Cir. 2012). Objective indicia are “relevant to the obviousness inquiry if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].” *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (internal quotation omitted). “[A] patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product is the invention disclosed and claimed.” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d

1366, 1373 (Fed. Cir. 2019) (internal quotation omitted). Objective evidence “must be considered before reaching an obviousness conclusion” because it is an “essential safeguard[] that protect[s] against hindsight bias.” *Liqwd, Inc. v. L’Oreal USA, Inc.*, 941 F.3d 1133, 1136-37 (Fed. Cir. 2019); *Dome Patent L.P. v. Lee*, 799 F.3d 1372, 1383 (Fed. Cir. 2015).

Here, there are numerous objective indicia of nonobviousness, including commercial success, industry praise, overcoming industry skepticism, and addressing a long-felt but unsolved need. Despite this evidence being publicly available, Petitioner failed to even cursorily address any such evidence in its Petition. Likewise, Dr. Beik failed to address or even consider objective indicia in his Declaration, even though consideration of objective indicia of nonobviousness is part of a complete and thorough *Graham* analysis. EX1002, ¶¶32-324. In fact, Dr. Beik testified that he could not remember whether he had made any attempt to identify objective indicia. EX2004, 154:5-156:17. Regardless, Dr. Beik made clear that any such evidence would not impact his analysis, as he testified that no amount of objective indicia would change his opinion that the challenged claims are obvious. *Id.*, 156:18-157:16.

Contrary to Petitioner and Dr. Beik’s bald assertions, the objective indicia clearly demonstrate that the challenged claims of the ‘551 Patent are not obvious.

1. CAB Is Entitled To A Presumption Of Nexus Between The Evidence And The Claimed Invention Because Its Commercial Products And Systems Are Coextensive With At Least Claim 1

The Federal Circuit has held that “if the marketed product embodies the claimed features, and is coextensive with them, then a nexus is presumed and the burden shifts to the party asserting obviousness to present evidence to rebut the presumed nexus.” *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000).

Dr. Phinney analyzed CAB's Integrated Grounding System, which CAB sells for use in PV installations, and concluded that CAB's system embodies the features of, and is coextensive with, at least claim 1, which is the only independent system claim of the '551 Patent. EX2064, ¶¶295-309, App. A. To conduct his analysis, Dr. Phinney studied relevant portions of CAB's website, installation guidelines, customer bid request and CAB quote documentation, and product testing, evaluation, and certification documents, including for specific CAB part numbers that constitute its Integrated Grounding System. *Id.*, ¶¶298-301, 303-304. Dr. Phinney concluded that CAB's connector assemblies (for use with its messenger support wire/EGC) provide an effective ground fault current path. *Id.*, ¶302.

Specifically, CAB's Integrated Grounding System comprises a conductive copper-clad messenger support wire/EGC from which cable hangers (and electrical

cables) are suspended. *Id.*, ¶305. Further, CAB's conductive messenger support wire/EGC is coupled to, and supported by, conductive piles through conductive mounting assemblies that include conductive messenger support wire/EGC clamps. *Id.*, ¶305, App. A, A1. In accordance with the first limitation of claim 1, CAB's system includes a multi-function line assembly including a multi-function line (i.e., messenger support wire/EGC). *Id.*, ¶306, App. A, A2-A3. Dr. Phinney concluded that CAB's messenger support wire/EGC supports cable hangers and electrical cables and serves as a grounding conductor for the system in accordance with the definition of a multi-function line. *Id.*

In accordance with the next claim limitation, CAB's conductive mounting assemblies (i.e., grounding mid-pier kits) are structured to be coupled to CAB's messenger support wire/EGC via conductive messenger wire/EGC clamps and are also structured to be coupled to conductive piles. *Id.*, ¶307, App. A, A3-A5. Lastly, in accordance with the last limitation of claim 1, the installation of CAB's system results in a multi-function line assembly including the conductive messenger wire/EGC being coupled to, and in electrical communication with, CAB's grounding mid-pier kit (i.e., conductive mounting assembly). *Id.*, ¶308, App. A, A6-A7.

2. The Non-Obviousness of the '551 Patent Is Evidenced by the Commercial Success of CAB's Integrated Grounding System

Commercial success is typically shown with evidence of “significant sales in a relevant market.” *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006) (citation omitted). CAB's Integrated Grounding System has had significant sales in the solar industry as a result of the features of the claimed invention.

As Mr. Smith explains, after CAB overcame initial industry skepticism (*see* Section VI.F.4 *infra*), companies in the solar industry recognized CAB's Integrated Grounding System as a “game changer.” EX2061, ¶78. Subsequently, CAB's Integrated Grounding System saw substantial commercial success. CAB's sales of solar products nearly [REDACTED], and CAB began selling its solar products internationally. *Id.* Since 2018, approximately [REDACTED] of CAB's solar sales have been for CAB's Integrated Grounding System. *Id.*

The commercial success of CAB's Integrated Grounding System is analyzed in the Declaration of Jonathan D. Putnam, Ph.D. EX2044. In his Declaration, Dr. Putnam examined the commercial success of CAB's Integrated Grounding System and the bases for that success. *Id.* Dr. Putnam analyzed CAB's sales data, solar industry data, witness Declarations, and Dr. Phinney's Declaration. *Id.* Dr. Putnam compared the growth rate in solar capacity from 2015 to 2023 to the growth rate of

CAB's sales during that same period of time, to determine the excess of CAB's sales growth rate over industry growth rate. EX2044, ¶¶46-52. Dr. Putnam also details the cost savings of CAB's Integrated Grounding System over CAB's Standard System (which does not include integrated grounding) and customer demand specifically for the features of CAB's Integrated Grounding System. *Id.*, ¶¶34-39.

Dr. Putnam concludes that, by 2023, CAB's actual sales were [REDACTED], which was [REDACTED] in excess sales over predicted sales based on industry growth. *Id.*, ¶51. Dr. Putnam further concludes that CAB's Integrated Grounding System generated excess sales that were [REDACTED] [REDACTED]. *Id.* Dr. Putnam ultimately attributes [REDACTED] dollars of CAB's excess sales to its Integrated Grounding System, and concluded that there is a strong nexus between those excess sales and the commercial embodiment of the '551 Patent. *Id.*, ¶¶53-65.

3. CAB's Integrated Grounding System Has Received Industry Praise and Many Industry Awards

Industry praise for an invention may provide evidence of nonobviousness where the industry praise is linked to the claimed invention. *Geo. M. Martin Co. v. Alliance Mach. Sys. Int'l LLC*, 618 F.3d 1294, 1305 (Fed. Cir. 2010). CAB's Integrated Grounding System has received many industry awards, including:

- **2018 National Electrical Contractors Association's "Showstopper Award."** EX2061, ¶¶81-82; EX2021; EX2022.
- **Solar Power World Magazine's "2019 Top Solar Component Products."** EX2061, ¶83; EX2023.
- **Solar Power World Magazine's "2021 Top Solar Components and Equipment."** EX2061, ¶84; EX2034.
- **PV Magazine's 2021 Award in the "PV-BOS (Balance of System)" category.** EX2061, ¶85; EX2025.
- **Solar Power World's 2022 and 2023 Leadership in Solar Energy in wire management category.** EX2061, ¶86; EX2026; EX2027.

In addition to those awards, CAB's Integrated Grounding System has been praised by companies and professionals in the solar industry. Mr. Novak, the Owner of Tropenas Company, an engineering firm focusing on engineering resilient utility-scale solar systems, convinced his client to install CAB's Integrated Grounding System at the [REDACTED] EX2059, ¶¶1, 62-66. He described CAB's Integrated Grounding System as "particularly impressive", and stated that it successfully provided significant cost and time savings and safety benefits. *Id.*, ¶¶60, 62-66.

Mr. Bowman, former Vice President of Business Operations of FTC Solar, a company focused on the development of trackers for solar energy plants, testified that he "always recommended" CAB's Integrated Grounding System for use on any utility-scale solar projects using above-ground cable management. EX2028,

¶¶19-20, 54. He also described CAB's Integrated Grounding System as "the new industry standard." *Id.*, ¶55.

RP Construction Service ("RPCS") partnered with CAB on RPCS' new tracker system. EX2061, ¶20; EX2020. RPCS described CAB has having "pioneered the use of above ground cable management in grid-scale solar plants and has continually provided innovative designs and systems to meet customers' needs." EX2061, ¶80; EX2020, 3. In particular, RPCS highlighted CAB's newly released Integrated Grounding System. EX2020, 3.

Solar companies and engineering firms touted CAB's Integrated Grounding System as a "game changer." EX2061, ¶78. These industry awards and praise were a recognition of the innovation of CAB's Integrated Grounding System.

4. CAB's Integrated Grounding System Overcame Industry Skepticism

"Doubt or disbelief by skilled artisans regarding the likely success of a combination or solution weighs against the notion that one would combine elements in references to achieve the claimed invention." *WBIP, LLC v. Kohler*, 829 F.3d 1317, 1335 (Fed. Cir. 2016). Although the benefits of CAB's Integrated Grounding System over prior art grounding systems were readily apparent, CAB nevertheless had to overcome industry skepticism concerning whether the Integrated Grounding System was code-compliant.

Prior art steel messenger wire was insufficient to serve as the claimed multi-function line, and CAB needed to develop the necessary “material composition of the messenger wire itself, so as to allow for sufficient strength and conductivity to serve as both a support structure messenger wire and an equipment grounding conductor.” EX2061, ¶¶66, 69-70. CAB also engineered a sufficiently conductive clamp and bracket (for the claimed mounting assemblies) that were strong enough to support the messenger wire and sufficiently bonded. *Id.*, ¶¶66, 71-72. All of these issues invoked skepticism from the industry concerning whether CAB's Integrated Grounding System was code-compliant. *Id.*, ¶66.

After expensive development, testing and evaluation throughout 2016 and into 2017, CAB's Integrated Grounding System received certifications and safety listings demonstrating the System's code-compliance. *Id.*, ¶¶66, 73-75, 79. To further assuage industry concerns, CAB commissioned Brooks Engineering to prepare a white paper evaluating its Integrated Grounding System for compliance with the NEC, which was completed in November 2020. EX2061, ¶77; EX2033, ¶¶54, 65. Eventually, CAB was able to overcome this significant industry skepticism to enable its Integrated Grounding System to become the new industry standard and achieve commercial success. EX2028, ¶55; Section VI.F.2, *supra*.

5. CAB's Integrated Grounding System Addressed a Long-Felt But Unsolved Need

“Evidence of a long felt but unresolved need tends to show non-obviousness because it is reasonable to infer that the need would have not persisted had the solution been obvious.” *WBIP*, 829 F.3d at 1332 (citation omitted).

Since approximately 2014, when CAB's Standard System was first employed, prior art grounding systems in solar plant installations required separate grounding conductors disposed adjacent to the messenger wire and separate splices from the grounding conductor to each metal pile in order to provide an effective ground fault current path. EX1001, 1:36-2:17; EX2061, ¶¶31-32, 65, 67; EX2033, ¶¶37-38, 50-53; EX2028, ¶¶50-51; EX2059, ¶58; EX2064, ¶310. The process was “difficult, time consuming, and expensive.” EX1001, 2:12-16; EX2064, ¶310; EX2028, ¶¶51-52.

CAB's Integrated Grounding System addressed this long-felt need for a cheaper method of grounding above-ground messenger wire supported cable management systems. By eliminating the need for a separate grounding conductor or grounding jumpers, CAB's Integrated Grounding System reduced both material and labor costs. EX2028, ¶53; EX2033, ¶53; EX2059, ¶59; EX2067, ¶¶67-68. In addition to savings from materials and labor, CAB's Integrated Grounding System also provided savings from purchasing, shipping, staging, and handling. EX2059, ¶61. Beyond significant cost savings, CAB's System addressed safety concerns

with solar arrays by providing adequate grounding to reduce risks associated with potentially dangerous fault. *Id.*, ¶60.

CAB's Integrated Grounding System is "less expensive and [] can be installed quickly and easily," and is "compatible with existing support assemblies." EX1001, 2:17-20; *see also* EX2061, ¶¶66-68; EX2033, ¶¶52-53; EX2028, ¶¶51-55; EX2059, ¶¶59-61; EX2064, ¶311. Given these significant benefits addressing the solar industry's long-felt need for a cheaper method of providing an effective ground fault current path, Mr. Bowman described CAB's Integrated Grounding System as a "**no-brainer** ... when using [an] above-ground cable management system in a utility-scale solar application." EX2028, ¶53 (emphasis added).

VII. CONCLUSION

For the foregoing reasons, Petitioner has not met its burden of proving by a preponderance of the evidence that the challenged claims of the '551 Patent are obvious over Petitioner's asserted prior art.

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CERTIFICATE OF COMPLIANCE WITH WORD COUNT LIMITATION

Patent Owner certifies that its Response complies with the word count limitations of 37 C.F.R. §42.24(a)(1)(i). Based on Microsoft Word's "Word Count" feature, Patent Owner's Response contains 13,806 words, excluding the cover page, signature block, and the parts of the Patent Owner's Response exempted by 37 C.F.R. § 42.24(b)(1).

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 9th day of August, 2024, a true and correct copy of the foregoing **PATENT OWNER'S RESPONSE** was served by electronic mail on Petitioner's lead and backup counsel at the following email addresses:

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