

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.

IPR2024-00178
Patent 11,349,291 B2

Before JAMES P. CALVE, FRANCES L. IPPOLITO, and
NATHAN A. ENGELS, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

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

I. BACKGROUND

Affordable Wire Management, LLC (“Petitioner”) filed a petition requesting an *inter partes* review of claims 1–10, 14–22, 24, and 25 (the “challenged claims”) of U.S. Patent No. 11,349,291 (“the ’291 patent”) (Ex. 1001). Paper 1, 1 (“Pet.”). Cambria County Association for the Blind and Handicapped, Inc. (“Patent Owner”) filed a preliminary response. Paper 15 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2022) (“The Board institutes the trial on behalf of the Director.”). An *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Upon consideration of the evidence and arguments in the record, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. We therefore grant institution of an *inter partes* review.

A. *Related Proceedings*

The parties identify the following proceeding involving the ’291 patent: *Cambria County Association for the Blind and Handicapped, Inc. v. Affordable Wire Management, LLC*, No. 1:23-cv-00080 (D. Del.). Pet. 79; Paper 7 (Patent Owner’s Mandatory Notices), 1. The parties indicate that Patent Owner also asserted U.S. Patent No. 10,177,551 (“the ’551 patent”) in this district court litigation. Pet. 79; Paper 7, 1. Petitioner asserts that it has filed an *inter partes* review proceeding challenging the ’551 patent in IPR2024-00139. Pet. 79; *see* Paper 7, 1.

Petitioner also filed a second petition challenging claims 1–23 of the '291 patent. IPR2024-00182, Paper 1, 1. Concurrently with this Decision, the Board denies institution of *inter partes* review in IPR2024-00182.

B. Real Parties in Interest

Petitioner identifies itself as the real party in interest. Pet. 79. Patent Owner identifies itself as the real party in interest. Paper 7, 1.

C. The '291 Patent

The '291 patent describes cable hangars used in solar, mining, and electrical industries to support alternating current (AC), direct current (DC), and category five electrical cables from a messenger wire 12 as shown in Figure 1, which is reproduced below. Ex. 1001, 1:18–24, 3:19–42.

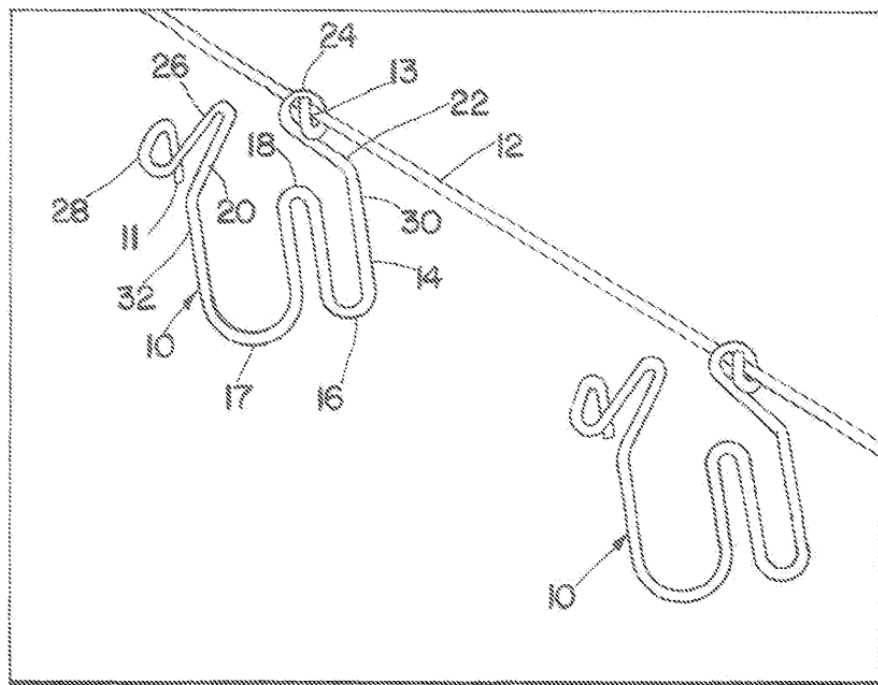


Fig. 1

Figure 1 shows hanger 10 with cable carrier formations 16, 17, sides 30, 32, divider 18, and data carrier loop 28. *Id.* at 6:18–43, 7:10–14. Hanger 10 is a round or flat-rolled galvanized/stainless steel spring wire 14. *Id.* at 6:37–40.

To lock hanger 10 onto messenger wire 12, spiral gripper 24 engages messenger wire 12 and sides 30, 32 are squeezed together until locking hook 26 engages messenger wire 12. Ex. 1001, 6:40–47. When released, locking hook 26 and gripper 24 exert a cooperative locking force on messenger wire 12 as shown in Figure 2, reproduced below. *Id.* at 6:40–62.

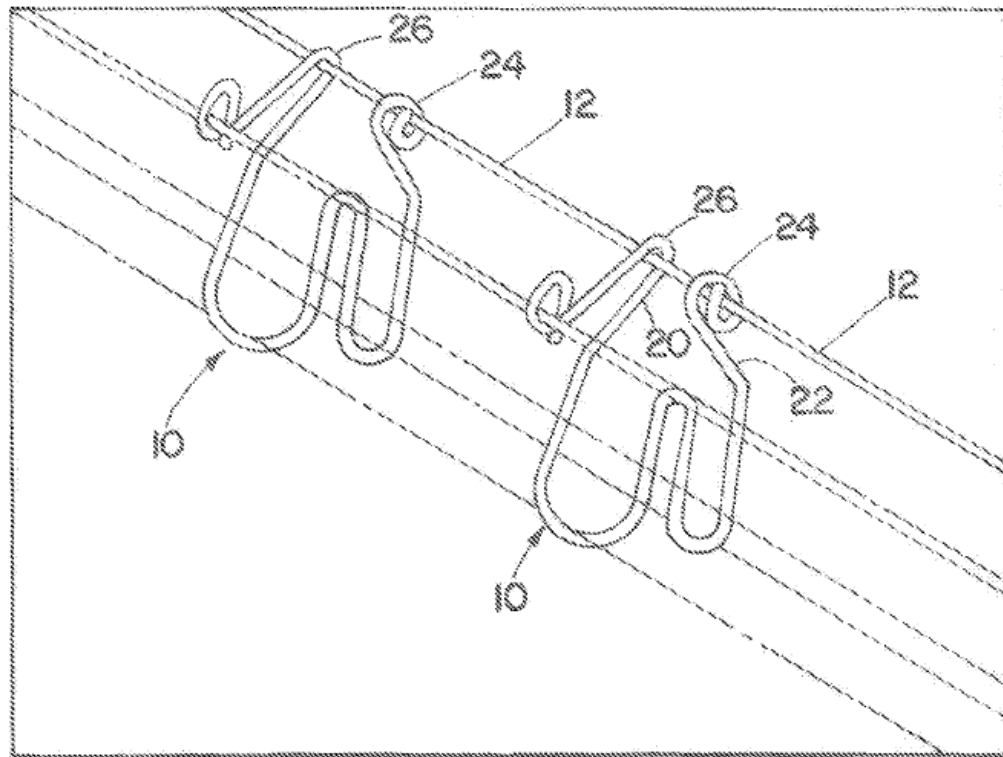


Fig. 2

Figure 2 shows spiral gripper 24 and locking loop 26 engaging messenger wire 12. *Id.* at 6:50–62. Spiral gripper 24 includes abutment surfaces 34, 36 that engage messenger wire 12. *Id.* at 6:54–56, 7:2–10. Locking hook 26 has abutment surface 38 that engages messenger wire 12 to create a locking force on messenger wire 12 with abutment surfaces 34, 36 on spiral gripper 24 and prevent cable hanger 10 from sliding along messenger wire 12 as shown in Figure 3, reproduced below. *Id.* at 3:30–42, 6:50–62, 7:14–26.

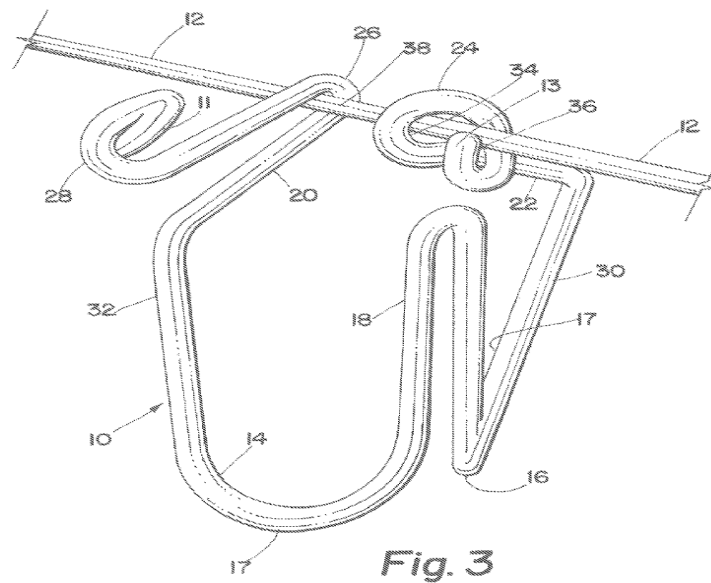


Figure 3 shows hanger 10 locked to messenger wire 12 by abutment surfaces 34, 36 of spiral gripper 24 and abutment surface 38 of locking hook 26 to retain hanger 10 securely in place on wire 12. *Id.* at 2:20–46, 6:63–7:26.

D. The '291 Patent Prosecution History

In a December 16, 2021, Office Action, the Examiner rejected the claims over admitted prior art relating to systems for organizing solar panel electrical cables in combination with cable hangers disclosed in US. Patent No. 2,384,440 to Carr, which is asserted in the Petition. Ex. 1015, 151–152. The Examiner found that the admitted prior art and Carr disclosed hangers that support cables on a messenger wire and determined that “it would have been obvious to substitute one cable hanger for the other” to support cables from a messenger wire. *Id.* at 152. In its Response, Patent Owner submitted a declaration of one of the inventors, Allen Garrett Smith, who testified that “messenger wire/hangers arrangements had never been employed in the solar industry” and the prior art cable hangers were used in the mining and electrical industries. *Id.* at 202. Mr. Smith testified that any references to the solar industry referred to Patent Owner’s own non-public testing. *Id.*

In the next office action following Patent Owner's response and its submission of Mr. Smith's declaration, the Examiner issued a Notice of Allowability. Ex. 1015, 210. In the Notice of Allowability, the Examiner provided the following statement of reasons for allowance:

The prior art does not disclose or suggest a system for organizing a plurality of electrical cables extending from a plurality of solar panels, with a plurality of cable hangers disposed along a messenger wire, with cable carrying surfaces structured to support at least one cable and separated by a cable carrier divider.

Id. at 210–211.

E. Challenged Claims

Claims 1, 6, 14, 19, and 24 are the independent claims challenged in this proceeding. Claims 2–5 and 8–10 depend from claim 1. Claim 7 depends from claim 6. Claims 15–18 and 20–22 depend from claim 14. Claim 25 depends from claim 24. Ex. 1001, 10:24–13:8. Claim 1 is illustrative of the claimed subject matter and is reproduced below.

1. A system for organizing a plurality of electrical cables extending from a plurality of solar panels, the system comprising:

a messenger wire structured to be supported a distance above the ground; and

a plurality of cable hangers structured to be disposed along, and suspended from, the messenger wire, each cable hanger having a plurality of cable carrying surfaces, each cable carrying surface being structured to support at least one electrical cable of the plurality of electrical cables,

wherein adjacent cable carrying surfaces of the plurality of cable carrying surfaces are separated by a cable carrier divider.

Ex. 1001, 10:24–37.

F. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 21):

Ground	Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1	1–5, 9, 10	103 ¹	Caveney ²
2	14–18, 21, 22	103	Caveney, Almy ³
3	1–10, 14–22, 24, 25	103	Carr, ⁴ Almy

Petitioner relies on a Declaration of Dr. Omid Beik to support its Petition. Ex. 1002. Patent Owner relies on a Declaration of Dr. Edward C. Kern, Jr. to support its Preliminary Response. Ex. 2001.

II. DISCUSSION

A. Level of Ordinary Skill in the Art

Petitioner asserts that a skilled artisan would have had “a bachelor’s degree in a pertinent discipline, such as electrical engineering, civil engineering, mechanical engineering or equivalent with 2–3 years of experience in electrical utility systems, planning, and design.” Pet. 20 (citing Ex. 1002 ¶ 51). Petitioner also asserts that the number of years of experience could be higher or lower given the level of education and vice versa. *Id.* (citing Ex. 1002 ¶ 51).

¹ The Leahy-Smith America Invents Act (“AIA”) revised 35 U.S.C. § 103 effective on March 16, 2013. Because the ’291 patent has an effective filing date after March 16, 2013, we apply the AIA version of 35 U.S.C. § 103.

² US 7,520,476 B2, issued Apr. 21, 2009 (Ex. 1003, “Caveney”).

³ US 2010/0139731 A1, published June 10, 2010 (Ex. 1004, “Almy”).

⁴ US 2,384,440, issued Sept. 11, 1945 (Ex. 1005, “Carr”).

Patent Owner asserts, “[f]or purposes of its Preliminary Response, Patent Owner adopts Petitioner’s definition of a [skilled artisan],” and “Dr. Kern has also assumed Petitioner’s definition of a [skilled artisan] for purposes of his analysis set forth in his declaration.” Prelim. Resp. 27 n.2 (citing Ex. 2001 ¶ 20).

On the present record, we find that Petitioner’s uncontested level of ordinary skill in the art is consistent with the ’291 patent and the prior art of record. Therefore, we adopt Petitioner’s level of ordinary skill in the art, as articulated above, in our consideration of the issues presently before us.

B. Claim Interpretation

We interpret claims “using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under that standard, we construe a claim in accordance with its ordinary and customary meaning as understood by one of ordinary skill in the art and the prosecution history of the patent. *Id.*; *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc).

At this stage, neither party expressly proposes any construction of any claim terms. Pet. 20–21; *see generally* Prelim. Resp.

The parties disagree over the meaning of “electrical cables” used in all independent claims. Petitioner implicitly construes this term to mean cables that transmit data or current to include the telecommunication carrier cables disclosed in Caveney and Carr. Pet. 22, 47–48; Ex. 1003, 1:5–13, 2:62–64; Ex. 1005, 1:1:1–34. Patent Owner argues that “electrical cables” are “power cables” such as “DC and AC current-carrying cables that provide power,” and they are not category five cabling or high performance communications and aerial cables that do not carry current. Prelim. Resp. 27–29, 42–43.

On the current record, we preliminarily interpret “electrical cables” as “wiring that conducts current or signals.” The parties are encouraged to present relevant intrinsic and extrinsic evidence regarding the meaning of this term and whether the preamble should be construed as limiting.

This meaning is consistent with the ’291 patent’s description of cable hangers used to support “electrical cables [that] extend from *a power or signal source* to a location of application” in solar, mining, and electrical industries. Ex. 1001, 1:18–22 (emphasis added). The electrical cables are DC wires that attach to solar panels, AC cables that power motors to rotate solar panels, and category five cables for control wiring. *Id.* at 1:22–51.

The claims recite “electrical cables” not “electrical power cables.” Ex. 1001, 10:24–13:7. We do not limit “electrical cables” to particular types of cables, e.g., AC cables or DC cables, absent a lexicographic definition or a disclaimer in the specification, neither of which are asserted by either party in this proceeding. *See Phillips*, 415 F.3d at 1316.

This construction is consistent with an ordinary meaning of “cable” as “a conductor or group of conductors for transmitting electric power or telecommunication signals from one place to another.” *Britannica Academic*, available at <https://academic.eb.com/levels/collegiate/article/cable/18488>, viewed Mar. 22, 2024 (Ex. 3002); *IEEE 100: The Authoritative Dictionary of IEEE Standards Terms*, 7th Ed. 133, 358 (IEEE Press 2000) (“cable” is a transmission line for signal transmission system, an insulated conductor for communication and control cables, assembly of conductors in a protective sheath, or a conductor with insulation; “electric” is “containing, producing . . . or carrying electricity” whereas “electrical” is related to or pertaining to electricity but not having its properties or characteristics) (Ex. 3003).

The electrical cables are claimed as extending from a plurality of solar panels. Ex. 1001, 10:24–25, 10:49–50, 11:31–32, 11:59–60, 12:36–37. An improperly narrow reading of this language might limit the electrical cables to only DC power cables because only DC power cables extend from solar panels. *Id.* at 1:25–27. However, the ’291 patent describes three types of “electrical cables” that address the need in solar industries “for electrical cables to extend from a power or signal source to a location of application” (*id.* at 1:20–22) as (1) DC wires that attach to the solar panels and run to combiner boxes and inverters (*id.* at 1:22–27), (2) AC electrical cables that power motors that control trackers to rotate the solar panels to follow the sun to obtain maximum power during daylight (*id.* at 1:27–31), and (3) category five cables that provide power plant operators with feedback from solar panel arrays regarding the angle that panels are stationed and the angle to use to maximize power output (*id.* at 1:43–51). These electrical power and signal cables extend from solar panel arrays. *See* Ex. 2001 ¶¶ 39, 47, 54, 55.

The claimed cable hangers separate these electrical cables so that AC and DC electrical cables do not interfere with one another or category five electrical cables. Ex. 1001, 1:32–56, 2:1–6, 6:18–49, 3:58–4:2; *see* Ex. 1002 ¶ 32 (current-carrying cables create magnetic fields and must be spaced apart so their magnetic fields do not cross-link). Patent Owner’s arguments that “electrical cables” are limited to AC and DC power cables (Prelim. Resp. 42) is not supported by the claim language, specification, or a definition or disclaimer. The ’291 patent indicates that electrical cables come in a wide variety of wire and bundle sizes (Ex. 1001, 1:57–62, 3:53–57), and Carr’s carrier electrical cables can produce a cross-induction effect between the cables (Ex. 1005, 1:1:27–34, 1:2:20–27) like AC and DC electrical cables.

C. Principles of Law

A patent claim is unpatentable “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103. “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Similarly, “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *Id.* at 417.

The question of obviousness is resolved based on underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Patent Owner presents objective evidence of non-obviousness, which we discuss *infra* in our analysis of some of the grounds of unpatentability. Prelim. Resp. 50–53.

D. Ground 1: Alleged Obviousness Over Caveney

Petitioner asserts that claims 1–5, 9, and 10 are unpatentable under 35 U.S.C. § 103 over Caveney in view of the knowledge of a skilled artisan. Pet. 21–36.

1. *Caveney*

Caveney discloses a multi-tiered cable support system for supporting high-performance cabling. Ex. 1003, 1:6–8. Figure 1 is reproduced below to illustrate multi-tiered cable support system 30. *Id.* at 2:65–66.

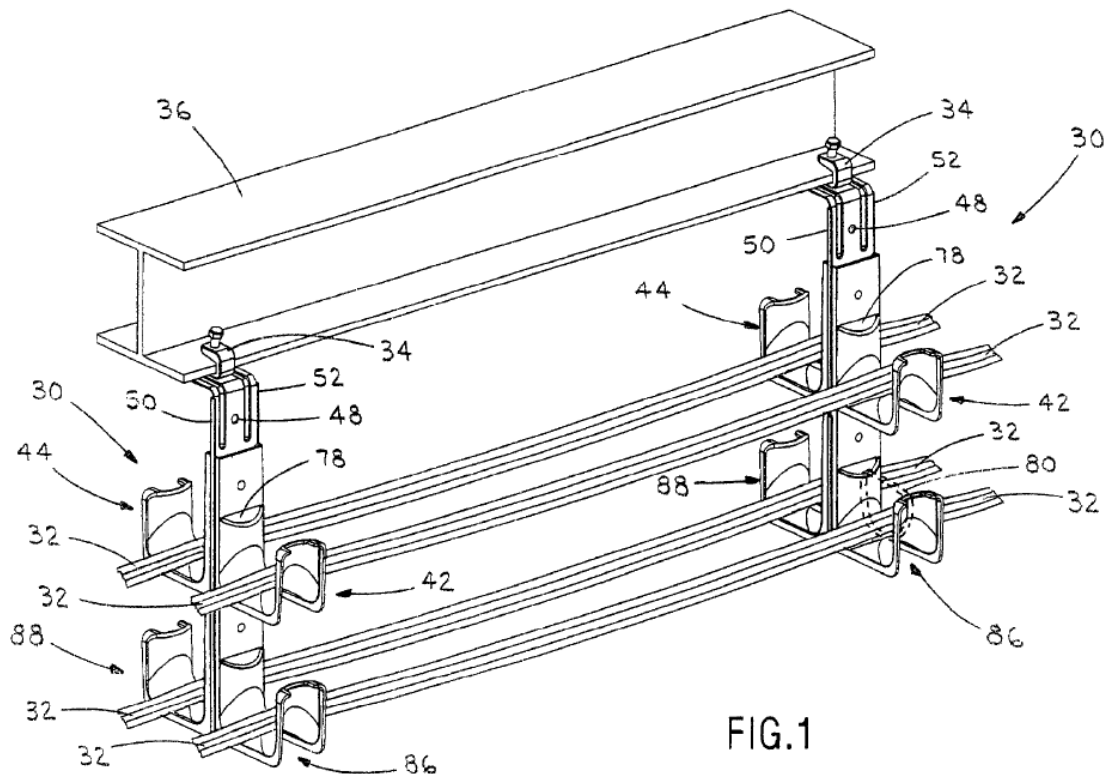


Figure 1 shows multi-tiered cable support system 30 secured to I-beam 36 by I-beam clamp bracket 34, but it “may be secured directly to any fastener or structure” including brackets, joists, ceilings, or walls. *Id.* at 2:65–3:9. Cable support system 30 includes first cable support member 42 and second cable support member 44 secured to hanger plate 40 with flanges 50, 52 for added strength. *Id.* at 3:12–14. First cable support member 42 includes slot 78 for routing a cable retainer, e.g., cable tie 80, around first cable support member 42 to secure cables 32 therein, and second cable support member 44 is “identical to first cable support member 42.” *Id.* at 3:45–50.

2. *Motivation to Combine and Expectation of Success*
a. *Petitioner's Contentions*

Petitioner contends that a skilled artisan would have been motivated to modify Caveney's teachings for use in solar installations with a plurality of solar panels as a routine implementation that would have posed no technical risk and would have achieved predictable benefits of improving wire runs in solar installations. Pet. 23 (citing Ex. 1002 ¶¶ 55–58). Petitioner asserts that cable management was a problem the solar industry shared with electrical industries that used cable management systems to suspend electrical cables, and it would have been obvious to use Caveney's system that supports high performance cables with cables extending from solar panels. *Id.* (citing Ex. 1001, 1:18–22; Ex. 1003, 2:62–64; Ex. 1002 ¶¶ 52, 56, 57).

Petitioner asserts that a joint report of the Jet Propulsion Laboratory and Underwriters' Laboratories indicated that a messenger with rings and saddles for conductor support is a "practical PV [photovoltaic] application . . . for terrestrial arrays located away from the building." Pet. 24 (citing Ex. 1007,⁵ 39). Petitioner asserts the Snake Tray company released a cable tray system with plural spaced apart hangers designed to be suspended from a messenger wire used in solar installations in 2012. *Id.* (citing Ex. 1008⁶).

⁵ Safety Requirements for Wiring Systems and Connectors for Photovoltaic Systems, JPL Contract No. 955392, Sept. 1984, prepared for the Jet Propulsion Laboratory by Underwriters Laboratories Inc., Ex. 1007 ("UL Report").

⁶ Snake Tray, "Solar Snake Tray Announces New Cable Tray That Attaches to Messenger Wire Rope for Solar Installations," 2012, available at <https://www.snaketray.com/solar-snake-tray-announcesnew-cable-tray-that-attaches-to-messenger-wire-rope-for-solarinstallations/>.

Petitioner contends that safety codes disclosed suspending current-carrying wires from a messenger wire with cable hangers. Pet. 24 (citing Ex. 1009 (*National Electrical Code*, NFPA 70, National Fire Protection Association, 2008 Edition), 241). Petitioner asserts that using Caveney's hangers to suspend cables from a messenger wire in solar installations "would have yielded predictable results and [a] reasonable expectation of success because the teachings of *Caveney* employ well-known wire management devices and techniques to address the same issues in the solar industry and comply with industry standards." *Id.* (citing Ex. 1002 ¶ 55).

b. Patent Owner's Arguments

Patent Owner argues that Caveney teaches multi-tiered systems for supporting high performance cabling for the telecommunications industry, and a skilled artisan would understand "high performance cabling" is used to transmit or communicate *data* over computer networks rather than *power* from electrical cables extending from solar panels. Prelim. Resp. 27. Patent Owner asserts that Caveney describes multi-tiered systems in U.S. Patent No. 5,740,994 to Laughlin (Ex. 2002) as cable supporting systems for high performance communications cables and category five cables such as fiber optic cables that are not "electrical cables" as claimed in the '291 patent. *Id.* at 27–28. Patent Owner argues that a skilled artisan would understand that "power cables" are "electrical cables" such as DC and AC current-carrying cables that are used to provide power, and Caveney's high performance cables are not "electrical cables." *Id.* at 28–30. Patent Owner asserts that Caveney does not disclose "electrical cables" or render obvious a system that organizes a plurality of electrical cables extending from solar panels. *Id.* at 30.

c. Analysis

Caveney's multi-tiered cable supports 30 support high performance cabling used in the telecommunications industry by attaching to pre-existing building structures, such as I-beams, joists, ceilings, and walls, and also by attaching to fixed brackets, such as ladder rack bracket 38 using fasteners. Ex. 1003, 1:5–10, 2:65–3:25, 4:5–40, Figs. 1, 3–7, 10–13, 20–22. Petitioner does not assert that Caveney's cable supports attach to messenger wires. *See* Pet. 22–30. Petitioner asserts that Caveney's cable hangers are “designed to attach to the disclosed ‘threaded rod’ [and] could also attach to a messenger cable because both structures have a circular cross-section.” Pet. 25–26.

We are not persuaded that Caveney's cable hangers are “structured to be disposed along, and suspended from, the messenger wire” as claimed. We reproduced Figure 3 of Caveney below to illustrate Caveney's structure.

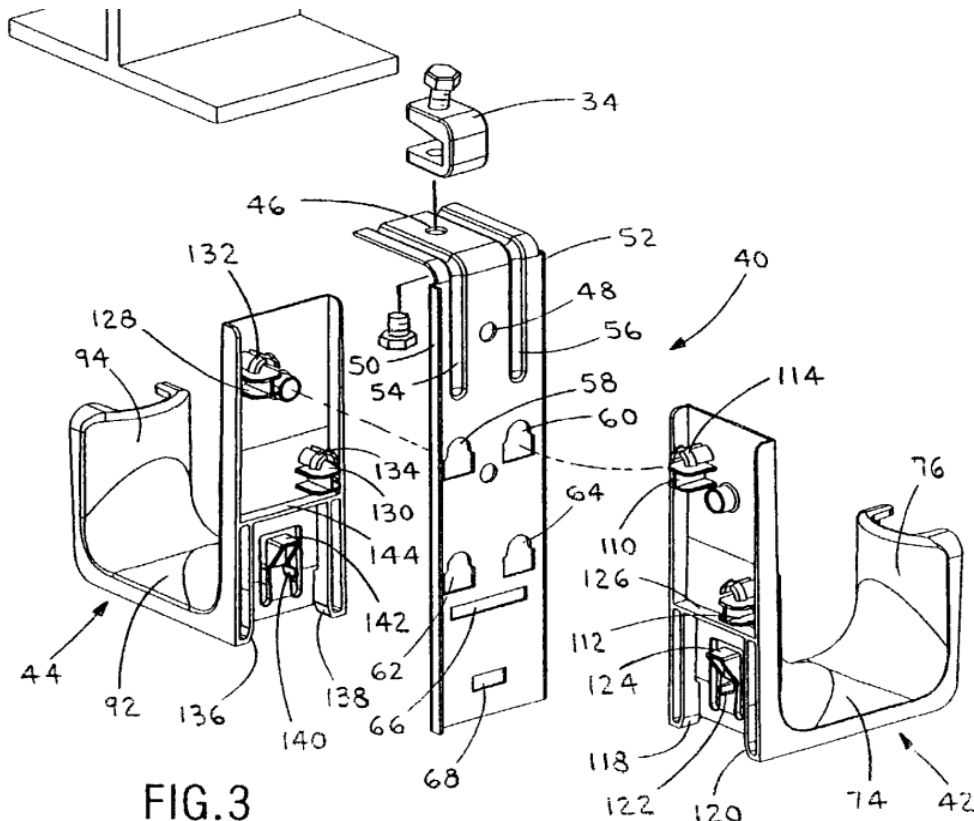
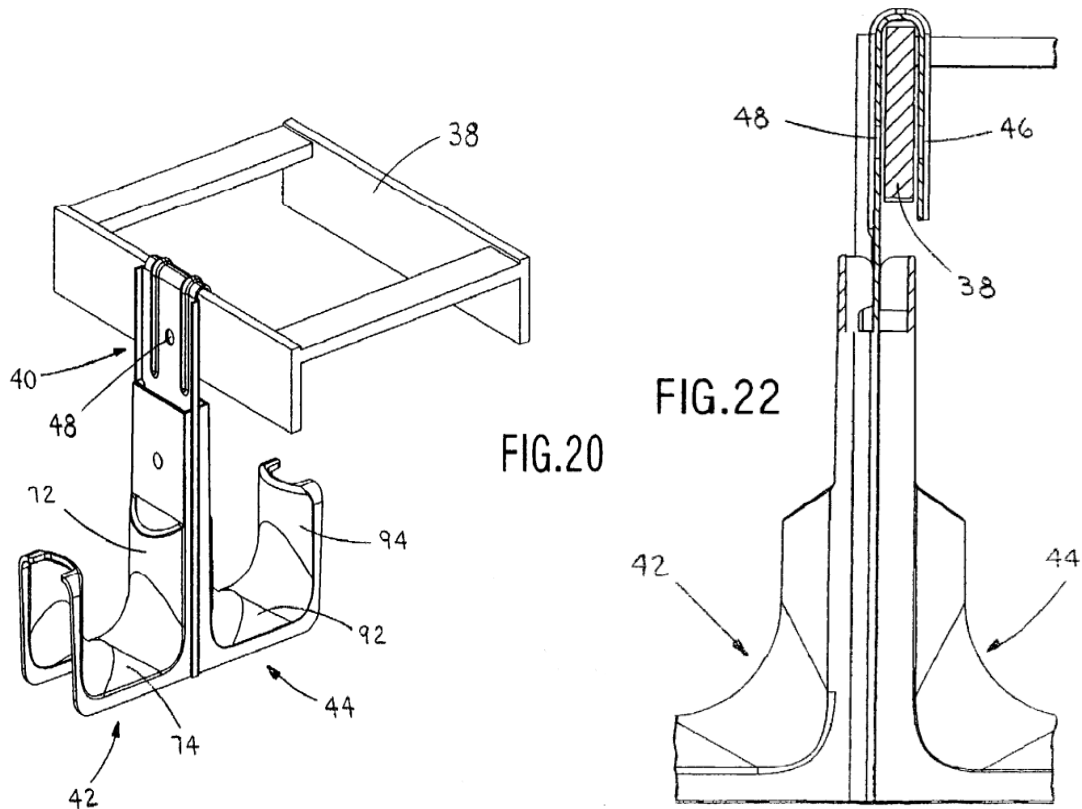


Figure 3 of Caveney shows hanger plate 40 with *apertures 46, 48* structured to receive a threaded rod (unnumbered) to secure hanger plate 40 to I-beam clamp bracket 34 and building structure such as an I-beam (shown in part in Figure 3). On this record, we are not persuaded that apertures 46, 48 formed in hanger plate 40 to allow hanger plate 40 to attach to clamp bracket 34 and building structure via a threaded rod also would enable hanger plate 40 to be disposed along and suspended from a messenger wire as claimed. We are not persuaded on this record that the circular cross-section of apertures 46, 48 that receives threaded rods that attach hanger plate 40 to various building structures would allow hanger plate 40 to be suspended from and disposed along a messenger wire. We disagree that circular cross-section apertures 46, 48 that are structured to receive a threaded rod to fasten hanger plate 40 to a building structure teach or suggest hangers “structured to be disposed along, and suspended from, the messenger wire,” as claimed. Pet. 25–26.

At this stage, we agree with Dr. Kern’s testimony that Caveney uses threaded rods as *fasteners* to attach cable hangers to structures such as ladder brackets, joists, I-beams, ceilings, and walls. Ex. 2001 ¶ 127 & n. 4.

Dr. Kern’s testimony is supported by Caveney’s disclosure of hanger plates 40 of the cable support systems including apertures 48 “for securing hanger plate 40 directly to a structure, such as ladder rack 38, as shown in FIGS. 20 and 22.” Ex. 1003, 3:21–25. We agree with his testimony that the description of threaded rods in Caveney refers to *fasteners* used to secure hanger plate 40 directly to *structures* such as ladder racks, walls, ceilings, or joists of a building via aperture 48. Ex. 2001 ¶ 127 & n. 4. We reproduce Figures 20 and 22 of Caveney below to this ladder rack and hanger structure.



Figures 20 and 22 show cable support member 44 secured to ladder rack 38 by hook-shaped hanger plate 40 via axially aligned apertures 46, 48 for a threaded bolt fastener (not shown). Ex. 1003, 2:45–50, 3:1–28, 5:63–67. Caveney also uses a threaded bolt to secure hanger plate 40 to I-beam clamp bracket 34 in Figure 3 above. *Id.* at 2:65–3:28, 4:41–53, Figs. 3–7, 10–13.

When Caveney uses a hook-shaped hanger plate 40 to secure the cable support to ladder rack 38 (Pet. 25–26), hanger plate 40 is secured to ladder rack 38 by its axially aligned apertures 46, 48 (Ex. 1003, 3:21–25, 5:63–67, Figs. 20–22) and a threaded rod fastener (*id.* at 3:3–5) (not shown). We are not persuaded that the circular apertures 46, 48 that allow Caveney’s hanger plate 40 to be secured by a threaded rod to ladder rack 38 also would allow hanger plate 40 to “be disposed along, and suspended from” a messenger wire as claimed, or that they teach or suggest such structure. *See* Pet. 25–26.

d. Conclusion

On this record, Petitioner has not shown sufficiently that it would have been obvious to use Caveney's cable support systems, which attach to brackets and pre-existing interior building structures, to support electrical cables that extend from solar panels along a messenger wire above ground, as claimed, with a reasonable expectation of success.

3. Independent Claim 1

a. 1[a]: "A system for organizing a plurality of electrical cables extending from a plurality of solar panels, the system comprising:"

(1) Petitioner's Contentions

Petitioner asserts that Caveney discloses a multi-tiered cable support system for organizing high performance cables 32, and a skilled artisan would have been motivated to use this system to support cables extending from solar panels and to address the similar challenges of cable support and management in the solar industry, which uses cable hangers and messenger wires to support current cables and data cables. Pet. 22–24 (citing Ex. 1003, 1:5–37, 2:62–65, 6:33–47, Fig. 1; Ex. 1002 ¶¶ 52, 55–58; Ex. 1001, 1:18–22; Ex. 1007, 39; Ex. 1008; Ex. 1009, 241).

(2) Patent Owner's Arguments

Patent Owner asserts that Caveney's "high performance cabling" is used to communicate data rather than AC and DC power in the context of solar panels. Prelim. Resp. 27–28 (citing Ex. 2001 ¶¶ 103, 106, 107). Patent Owner asserts that Caveney cites Laughlin, which also supports high performance communications cables and distinguishes high performance communications cables from "power cables." *Id.* at 27–28 (citing Ex. 2002, 1:4–7).

According to Patent Owner, “*Laughlin* actually distinguishes such high performance communications cables from ‘power cables’ and cautions against placing the high performance communications cables too close to power cables.” Prelim. Resp. 28 (citing Ex. 2002, 1:44–46; Ex. 2001 ¶ 106); *see* Ex. 1003, 1:9–16; Ex. 2001 ¶ 104. Patent Owner asserts that Caveney does not organize electrical cables as claimed. Prelim. Resp. 34. Patent Owner asserts that the 2014 National Electrical Code (NEC) requires “separat[ing] AC and DC power cables from each other, and also addresses the need to separate AC and DC power cables from data wiring.” *Id.* Patent Owner argues that Caveney does not use its hanger to separate AC and DC power cables from one another. *Id.* (citing Ex. 1003, 1:5–7).

(3) *Analysis*

To the extent the preamble is limiting, we are not persuaded on this record that Caveney’s support systems, which are designed to be secured to building structures such as I-beams, ceilings, walls, joists, and brackets by fasteners such as threaded rods, teach or suggest a system for organizing a plurality of electrical cables extending from solar panels in element 1[a]. As discussed in Section II.D.2. *supra*, we are not persuaded on this record that a skilled artisan would have used Caveney’s cable support system to suspend electrical cables extending from solar panels from a messenger wire, or that solar panels include the sort of structures for which Caveney’s cable support system is designed to be secured in order to support electrical cables.

(4) *Conclusion*

To the extent the preamble is limiting, we find that Petitioner has not shown sufficiently that Caveney teaches or suggests element 1[a]. The parties also are encouraged to address whether the preamble is limiting.

- b. *1[b]: “a messenger wire structured to be supported a distance above the ground;”*

(1) *Petitioner’s Contentions*

Petitioner asserts that Caveney discloses that “cable support system 30 *may be secured directly to any fastener or structure, including but not limited to a threaded rod,*” and it could attach to a messenger cable because both structures have a circular cross-section. Pet. 25–26 (quoting Ex. 1003, 3:3–5; citing Ex. 1002 ¶¶ 59–62). Petitioner asserts that “*Caveney’s cable hanger can be easily adapted to attach to any number of structures and doing so would have been trivial,*” and a skilled artisan would understand that the ladder rack attachment shown in Caveney’s Figures 20–22 “*would easily be configured to attach to a messenger wire.*” *Id.* at 26 (citing Ex. 1002 ¶ 60).

(2) *Patent Owner’s Arguments*

Patent Owner asserts that Caveney distinguishes fasteners that fasten items to structures from the structures themselves, and asserts that a threaded rod is a fastener, not a structure to which a cable support system is attached. Prelim. Resp. 35–36 (citing Ex. 2001 ¶ 127). Patent Owner asserts that its position is supported by Laughlin, which Caveney improves upon, because Laughlin uses “all kinds of clamps, clips or brackets” that fasten to internal structures of a building, such as Caveney’s “I-beams, joists, ceilings and walls.” *Id.* at 36–38 (citing Ex. 2002, Abstr.; Ex. 2001 ¶¶ 129–32).

(3) *Analysis*

Even accepting Petitioner’s contention that Caveney’s cable support system is supported on a threaded rod, we are not persuaded that Caveney teaches or suggests that its cable support system can be suspended from, and disposed along, a messenger wire as discussed in Section II.D.2. *supra*.

On the present record, we determine that Caveney uses threaded rods to *fasten* cable supports to I-beams, ladder rack 38 and I-beam clamp 34 via apertures 46, 48. Ex. 1003, 2:65–3:28, 4:41–53, 6:12–15, Figs. 1–7, 10–13, 21, 22. Dr. Beik does not explain how a ladder rack in Figures 20–22 “could be easily configured to attach to a messenger wire.” Ex. 1002 ¶ 60; Pet. 24. His testimony does not indicate what features to reconfigure to attach to a messenger wire, whose structure differs from Caveney’s building structures.

(4) *Conclusion*

On the present record, Petitioner has not shown sufficiently that Caveney teaches or suggests a messenger wire structured to be supported a distance above the ground as recited in element 1[b].

- c. *1[c]: “a plurality of cable hangers structured to be disposed along, and suspended from, the messenger wire, each cable hanger having a plurality of cable carrying surfaces, each cable carrying surface being structured to support at least one electrical cable of the plurality of electrical cables;”*

(1) *Petitioner’s Contentions*

Petitioner asserts that Caveney’s Figure 1 shows two cable hangers disposed along and suspended from a structure. Pet. 27 (citing Ex. 1003, 2:62–65, 6:33–47, Fig. 1). Petitioner asserts that Caveney also discloses cable hangers having a plurality of cable carrying surfaces that are structured to support at least one electrical cable, namely, high performance cables 32. *Id.* at 27–28 (citing Ex. 1003, 2:62–65, 3:37–47, 4:41–53, 6:27–32).

(2) *Patent Owner’s Arguments*

Patent Owner argues that Caveney supports its cable support system from identified, pre-existing structures, not a messenger wire, and a threaded rod is a fastener not a messenger wire. Prelim. Resp. 35–38 & n.3.

(3) *Analysis*

On this record, we find that Caveney’s cable hangers are secured to I-beams, joists, walls, ceilings, and ladder rack 38 via apertures 46, 48 and a fastener as discussed in Section II.D.2. *supra*. Ex. 1003, 3:1–28, 5:63–67, Figs. 1–7, 10–13, 20–22. We are not persuaded that the cable hangers are “structured to be disposed along, and suspended from, the messenger wire,” as claimed. We agree with Dr. Kern’s testimony that Caveney describes its cable hangers as designed to be fastened to pre-existing structures such as internal building structures. Ex. 2001 ¶¶ 127–130. In contrast, the claimed cable hangers are “structured” with spiral gripper 24 and locking loop 26 to lock onto messenger wire 12 via abutment surfaces 34, 36, 38 that retain the hangers in place. Ex. 1001, 2:15–67, 6:18–7:26, Figs. 1–3. Prior art hangers fall off or slide out of their spacing, but the locking arm of the claimed cable hangers securely retains the hangers in place even when bumped or knocked during cable installation. *Id.* at 2:31–42; *see also* Section I.C. *supra*.

At this stage, we are not persuaded that Caveney’s cable hangers are “structured to be disposed along and suspended from, the messenger wire” as claimed, when they are designed to fasten to building structures and fixed brackets using threaded rods with hanger plates 40 and I-beam clamps 34 as discussed *supra*. Ex. 1003, 3:1–28, 5:63–67, Figs. 1–7, 10–13, 20–22.

(4) *Conclusion*

On this current record, we determine that Petitioner has not shown sufficiently that Caveney teaches or suggests element 1[c].

d. Conclusion

On this record, we determine that Petitioner has not established a reasonable likelihood that claim 1 is unpatentable over Caveney.

4. *Claims 2–5, 9, and 10*

a. *Petitioner’s Contentions*

Petitioner provides detailed contentions that Caveney discloses three, four, and five cable carrying surfaces as recited in claims 2–4, a vertical cable carrier divider as recited in claim 5, and a formation to support a data carrier close to the messenger wire as recited in claims 9 and 10. Pet. 30–36.

b. *Patent Owner’s Arguments*

At this stage, Patent Owner does not contest Petitioner’s contentions regarding claims 2–5, 9, and 10. *See generally* Prelim. Resp.

c. *Analysis*

We find that Petitioner’s contentions that Caveney teaches or suggests the additional subject matter recited in claims 2–5, 9, and 10 do not cure the deficiencies of Caveney for claim 1 from which these claims all depend.

d. *Conclusion*

On this record, we determine Petitioner has not shown a reasonable likelihood that claims 2–5, 9, and 10 are unpatentable over Caveney.

E. *Ground 2: Alleged Obviousness Over Caveney and Almy*

Petitioner asserts that claims 14–18, 21, and 22 are unpatentable under 35 U.S.C. § 103 over Caveney and Almy. Pet. 36–42.

1. *Almy*

Almy discloses wire-based hanging wire-ways that support bundles of electrical cables extending between photovoltaic modules or module groups of a photovoltaic system. Ex. 1004 ¶¶ 2, 12. Photovoltaic system 100 is shown in Figure 1 of Almy with exemplary wire-based hanging wire-way 204B for supporting a bundle of electrical cables 206. *Id.* ¶ 17. Figure 1 is reproduced below to illustrate this arrangement.

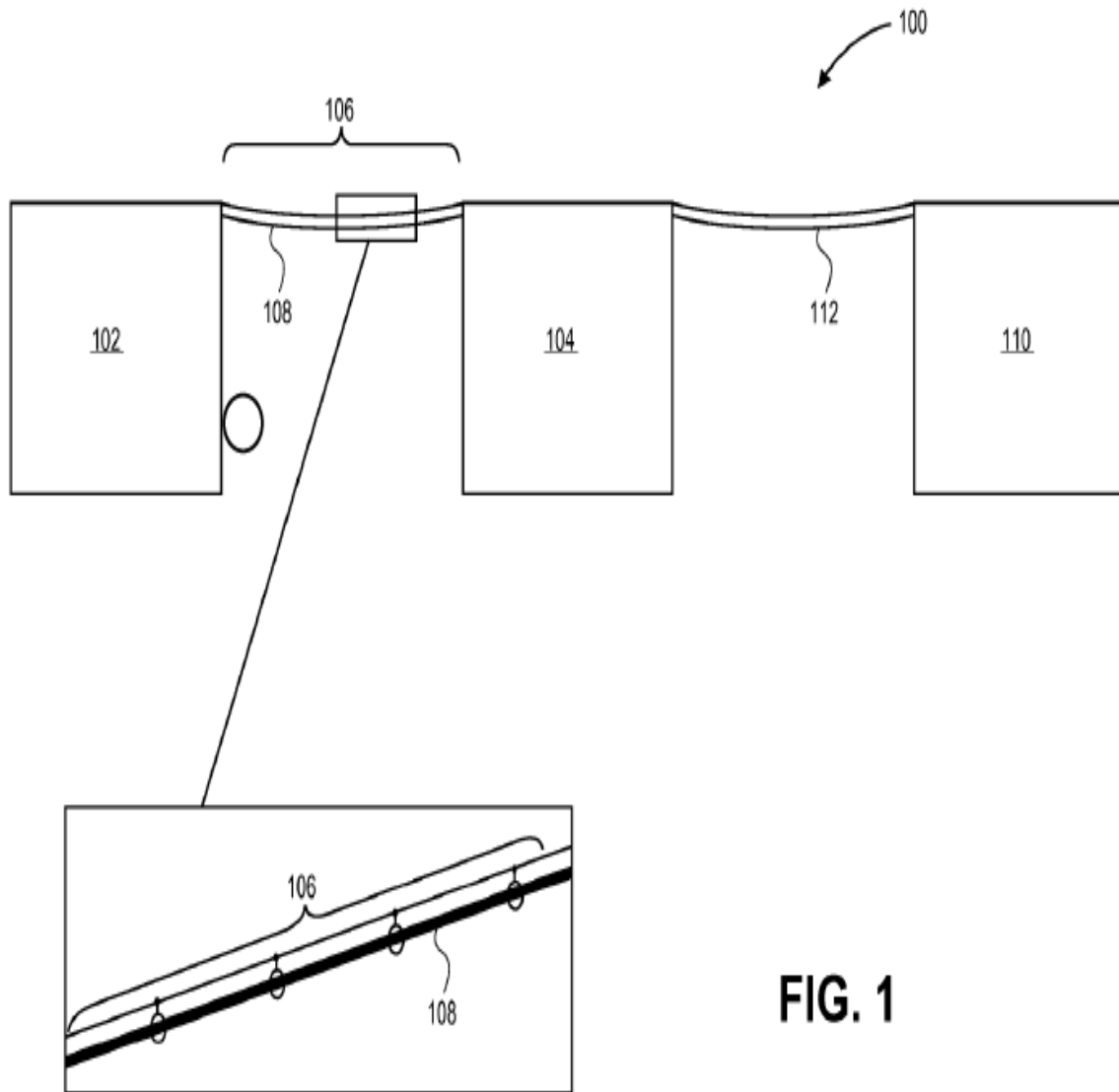


FIG. 1

Figure 1 shows photovoltaic system 100 with first photovoltaic module group 102 and second photovoltaic module group 104. *Id.* ¶ 17. Wire-based hanging wire-way 106 is coupled to first photovoltaic module group 102 and second photovoltaic module group 104, and a first bundle of electrical cables 108 is supported by wire-based hanging wire-way 106. *Id.*

Figure 2B is reproduced below to show wire-based hanging wire-way 200B comprising a plurality of independent wire loops 204B coupled to and suspended from wire-line 202B to receive a bundle of electrical cables 206.

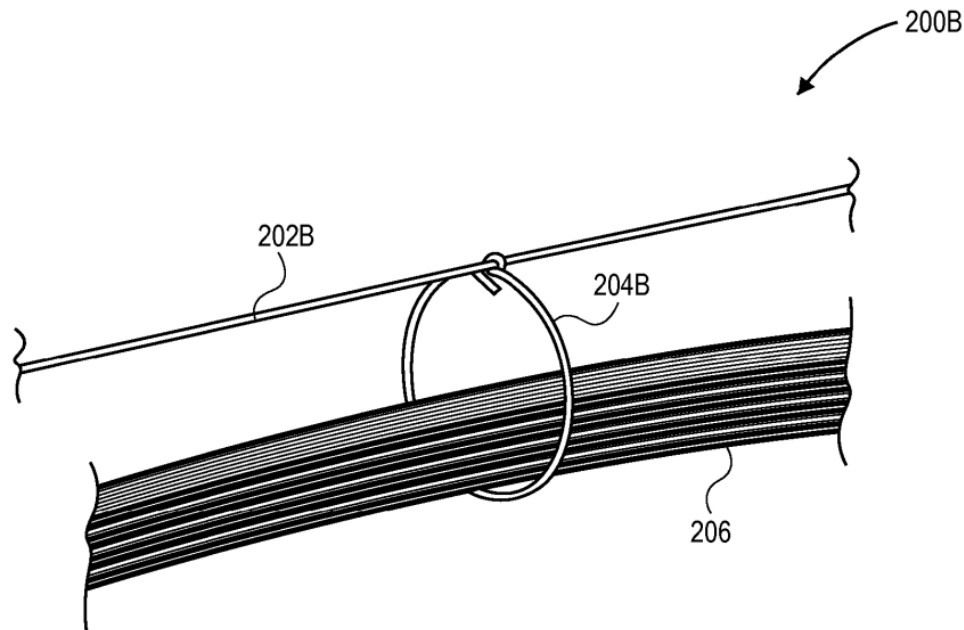


FIG. 2B

Figure 2B shows wire-based hanging wire-way 200B that includes wire-line 202B and a plurality of independent wire loops 204B coupled to wire-line 202B and adapted to receive and support a bundle of electrical cables 206. Ex. 1004 ¶ 22. Each wire loop 204B (only one shown) may be spaced from the next independent wire loop 204B by a distance of 0.25–2 meters. *Id.*

2. Motivation to Combine and Expectation of Success

a. Petitioner's Contentions

Petitioner asserts that a skilled artisan would have been motivated to replace Almy's wire loops with Caveney's cable hangers because Caveney's cable support system may be secured to any fastener or structure including a threaded rod, screw-on beam clamp bracket, ladder rack bracket, joist, wall, ceiling, or messenger wires and would prevent cross-linking by separating data and current-carrying cables in Almy. Pet. 37–38 (citing Ex. 1003, 1:27–29, 3:3–9, 4:46–53; Ex. 1004 ¶¶ 2, 12, 22; Ex. 1002 ¶¶ 76–79).

b. Patent Owner's Arguments

Patent Owner argues that Petitioner does not rely on Almy to teach organizing a plurality of electrical cables by separating AC and DC power cables because Almy discloses only DC power cables. Prelim. Resp. 38–39. Patent Owner asserts that the Petition proposes to replace Almy's wire loops with Caveney's hangers, but Dr. Beik testifies that a skilled artisan would have replaced the wire loops *and* wire-way of Almy with a more permanent hanger support system of Caveney. *Id.* at 40 (citing Ex. 1002 ¶ 79; Pet. 38). Patent Owner argues that “Petitioner is doing nothing more than applying *Caveney* to a solar installation, motivated by hindsight.” *Id.* at 41. Patent Owner asserts that Caveney does not disclose the limitations in claim 14 that also appear in claim 1 for the reasons discussed for Ground 1. *Id.* at 42.

c. Analysis

We are not persuaded, at this stage of the proceeding, that a skilled artisan would have modified Almy's system by replacing wire loops 204B with Caveney's cable supports that attach to building structures and frames using fasteners as discussed in Section II.D.2. *supra*, rather than messenger wires extending from solar panels. As discussed in Section II.D. *supra* for Ground 1, Caveney's cable hangers are secured to building structures and frames by threaded rod fasteners. On this record, we are not persuaded that the hanger plates 40 and clamps 34 that fasten Caveney's cable hangers to building structures and brackets using apertures 46, 48 and fasteners would secure Caveney's cable hangers to Almy's messenger wire, or that a skilled artisan would have been motivated to modify these structures of Caveney to attach to, and be disposed along, Almy's messenger wire in order to replace Almy's closed wire loops 204B with Caveney's open cable supports 42, 44.

Dr. Beik testifies that “*Caveney* is directed at a multi-tiered cable hanger that can be adapted for attaching to a variety of structures or support surfaces, including messenger wires,” but he supports this assertion by citing *Caveney*’s disclosure that cable support system 30 is secured to any fastener or structure such as a threaded rod, different brackets, a joist, a ceiling, or a wall. Ex. 1002 ¶ 76 (citing Ex. 1003, 3:3–9). On the current record, we find that the threaded rods secure cable support system 30 to the structures. *See* Ex. 1003, 2:65–3:1, 3:21–28, 5:63–67, 6:12–15, Figs. 1–7, 20–22. We find that *Caveney*’s cable supports are designed to attach to fixed, rigid structures such as brackets, joists, ceilings, and walls in a building using threaded rods with hanger plates 40 and brackets 34 that have apertures 46, 48 to receive threaded rod fasteners that secure the cable hangers to building structures. *Id.* at 3:1–28, 5:63–67, Figs. 1–7, 10–13, 20–22. We are not persuaded on this record that the threaded rod fasteners teach or suggest messenger wires.

d. Conclusion

On this record, we determine Petitioner has not shown sufficiently that a skilled artisan would have been motivated to combine the teachings of *Caveney* and *Almy* as asserted by Petitioner to render claim 14 unpatentable.

3. Independent Claim 14

a. Petitioner’s Contentions

Petitioner provides detailed contentions that *Almy* discloses elements 14[a]–14[c] regarding a solar plant, plurality of solar panels, and plurality of electrical cables, and *Caveney* discloses elements 14[d]–14[g] for organizing electrical cables, a messenger wire, and cable hangers for the same reasons that *Caveney* discloses elements 1[a]–1[d] for Ground 1. Pet. 39–41 (citing Ex. 1004; Ex. 1002 ¶¶ 80–85; Ex. 1001, 1:18–22; Pet. Section VIII.A.1.a–d).

b. Patent Owner's Arguments

Patent Owner argues that Caveney does not disclose the limitations in claim 14 that appeared in claim 1 for the reasons discussed for Ground 1. Prelim. Resp. 42.

c. Analysis

We are not persuaded that Caveney discloses or suggests a messenger wire for supporting cable hangers or a plurality of cable hangers structured to be disposed along, and suspended from, a messenger wire as discussed in Section II.D.3. *supra*. Nor are we persuaded that a skilled artisan would have replaced Almy's wire loops 204B with Caveney's cable supports and open-loop hooks when Caveney's cable supports are structured to be secured to building structures by fasteners, but Almy's system supports electrical cables from a flexible wire-line 202B extending from solar panels by wire hangers that couple to wire-line 202B as discussed in Section II.E.1. *supra*.

d. Conclusion

We determine that Petitioner has not shown a reasonable likelihood that claim 14 is unpatentable over Caveney and Almy.

4. Dependent Claims 15–18, 21, and 22

a. Petitioner's Contentions

Petitioner provides detailed contentions that claims 15–18, 21, and 22 are unpatentable over Caveney and Almy because Caveney discloses the limitations of claims 15–18, 21, and 22 for the same reasons as claims 2–5, 9, and 10, which recite essentially the same limitations. Pet. 41–42.

b. Patent Owner's Arguments

Patent Owner does not argue claims 15–18, 21, and 22 separately apart from its arguments for claim 14. *See* Prelim. Resp. 38–42.

c. Analysis

Petitioner's reliance on Caveney to disclose additional elements of claims 15–18, 21, and 22 does not cure Caveney's deficiencies for claim 14, from which these claims depend directly or indirectly.

d. Conclusion

We determine that Petitioner has not shown a reasonable likelihood that claims 15–18, 21, and 22 are unpatentable over Caveney and Almy.

F. Ground 3: Alleged Obviousness Over Carr and Almy

Petitioner asserts that claims 1–10, 14–22, 24, and 25 are unpatentable under 35 U.S.C. § 103 over Carr and Almy. Pet. 42–76.

1. Carr

Carr discloses hangers for suspending cables from a supporting strand as shown in Figures 1 and 2, which are reproduced below.

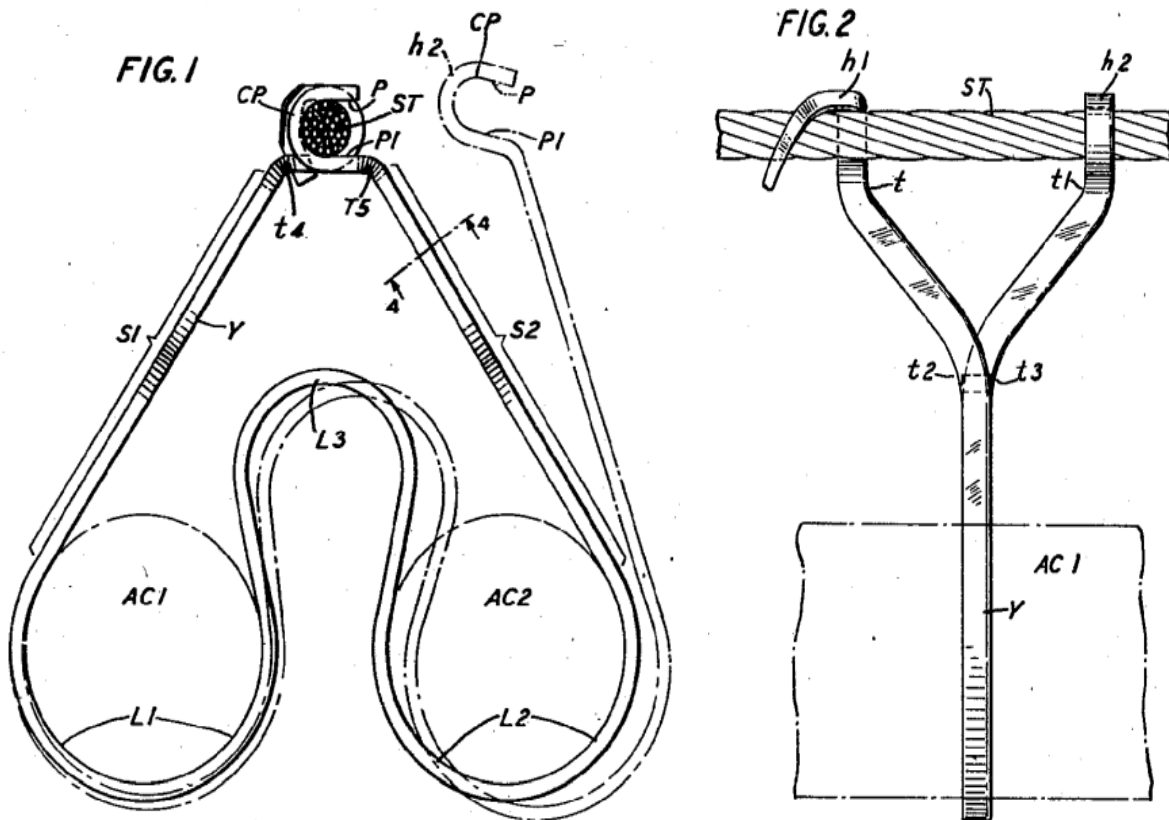


Figure 1 is a front view and Figure 2 is a side view of a hanger in a hooked position on supporting strand ST, with aerial cables AC1, AC2 supported respectively in open loops L1, L2. Ex. 1005, 1:1:36–49.⁷ Inverted open loop L3 formed between open loops L1, L2 serves to space cables AC1 and AC2 at any desired separation distance, e.g., one inch, to reduce the cross-induction effect between these conductors. *Id.* at 1:2:23–34.

The hanger has a laminated steel strip Y with a rectangular cross-section providing considerable hardness and resiliency. Ex. 1005, 1:1:46–51. Hanger Y is formed with helical-shaped hook portion h1 at one end to encircle supporting strand ST and hook portion h2 at the other end of hanger Y with parallel sides P, P1 and semicircular portion CP formed of a diameter corresponding to the diameter of supporting strand ST. *Id.* at 1:1:51–1:2:4.

Strip Y of the hanger has sufficient resiliency or stiffness to require a pressure of substantially twelve pounds for flexing it from a position shown in dot and dash lines to a hooked position shown in full line in Figure 1 so that the diameter of loops L1, L2 fits tightly around substantially two-thirds of the circumference of aerial cables AC1, AC2. Ex. 1005, 1:2:34–41. The tension to which hanger strip Y is subjected when it is hooked to supporting strand ST materially assists in preventing deformation of the different bent portions t1–t5 and loop L3 under the load of the aerial cables permitting the use of a metallic strip of relatively small cross-sectional area, less material required for each hanger, and less hangers required for any given length of aerial cable that is supported. *Id.* at 1:2:42–53.

⁷ The format 1:1:36–42 refers to Page:Column:Line as in Page 1:Column 1 (1 for the left column; 2 for the right column):Lines 36–42.

2. *Motivation to Combine and Expectation of Success*

a. *Petitioner's Contentions*

Petitioner asserts that a skilled artisan would have combined Carr and Almy as a routine implementation because Carr teaches a hanger device of simple and cheap construction that supports two aerial conducting cables in a spaced relation to minimize the cross-induction effect between the cables. Pet. 45 (citing Ex. 1005, 1:1:28–34; Ex. 1002 ¶¶ 96–99). Petitioner asserts that their combined teachings would have achieved predicable benefits of improving wire runs in solar installations by separating conductors with a more robust hanger. *Id.* Petitioner asserts that a skilled artisan would have recognized the problems of using Almy's wire loops to suspend electrical cables and would have replaced Almy's wire loops with Carr's hangers to prevent deformation of the cables and cross-talk between cables with a reasonable expectation of success given the compatibility of their teachings by using well-known overhead wire management devices and techniques. *Id.* at 46–47 (citing Ex. 1005, 1:1:28–34, 1:2:15–28; Ex. 1002 ¶¶ 98–99).

b. *Patent Owner's Arguments*

At this stage, Patent Owner does not contest Petitioner's contentions that a skilled artisan would have combined the teachings of Carr and Almy in the manner described. *See generally* Prelim. Resp.

c. *Analysis*

We find on this record, Petitioner has shown sufficiently that a skilled artisan would have combined Carr and Almy to replace Almy's wire loops with Carr's hangers to provide a simple, cheap construction that separates electrical cables and prevents the cross-induction effect between conductors (aerial cables AC1, AC2) as Carr teaches. Ex. 1005, 1:1:28–34, 1:2:23–53.

Using a known technique that improves one device to improve similar devices in the same way is obvious unless its application is beyond the level of ordinary skill in the art. *KSR*, 550 U.S. at 417. Dr. Beik testifies that the teachings of Carr and Almy may be combined as a routine implementation to achieve predictable results of improving wire runs in solar installations by separating conductors using a more robust hanger that would overcome the recognized disadvantages of using wire loops to suspend conductors from a messenger wire and prevent cross-linking. Ex. 1002 ¶ 98.

d. Conclusion

At this stage and on this record, Petitioner has shown sufficiently that a skilled artisan would have combined the teachings of Carr and Almy in the manner asserted.

3. Independent Claim 1

a. 1[a]: “A system for organizing a plurality of electrical cables extending from a plurality of solar panels, the system comprising:”

(1) Petitioner’s Contentions

Petitioner contends that, to the extent the preamble is limiting, Carr discloses a system of organizing a plurality of electrical cables using cable hangers suspended from a messenger wire and having plural cable carrying surfaces. Pet. 47–48 (citing Ex. 1005, 1:1:1–3, 1:1:27–34, Figs. 1–3). Petitioner asserts that Almy organizes electrical cables extending from solar panels, and a skilled artisan desiring to organize electrical cables extending from plural solar panels would have considered Carr’s cable management solutions for Almy’s system to address the common problems of minimizing the cross-induction effect between the cables and organizing the cables. *Id.* at 48–49 (citing Ex. 1004 ¶ 2; Ex. 1002 ¶ 101; Ex. 1001, 1:18–22).

(2) *Patent Owner's Arguments*

Patent Owner asserts that a skilled artisan would understand Carr's "conducting aerial cables" are lightweight telecommunication conductors for transmitting voice communication" and are not "electrical cables" that carry current within the asserted meaning of the '291 patent claims. Prelim. Resp. 42–43 (citing Ex. 1005, 1:1:4; Ex. 1001, 1:32–42; Ex. 2001 ¶ 158). Patent Owner asserts that Carr does not "organize" cables, because the '291 patent requires "separating AC and DC power cables from each other, and from data carriers" and Carr's hanger supports telecommunications cabling but does not separate multiple types of cable from one another. *Id.* at 43 (citing Ex. 1002 ¶¶ 32, 41–42; Ex. 1001, 1:32–56). Patent Owner asserts that Almy only supports DC cables and does not separate multiple types of cables from one another. *Id.* at 43–44 (citing Ex. 2001 ¶ 160).

(3) *Analysis*

As discussed in Section II.B. *supra*, we interpret "electrical cables" as "wiring that conducts current or signals." Carr organizes aerial cables to minimize the "considerable induction effect between the cables." Ex. 1005, 1:1:1–34. Absent a disclaimer or lexicographic definition, neither of which are asserted, we give the claims their plain, ordinary meaning as understood by a skilled artisan in light of the specification. *Phillips*, 415 F.3d at 1312, 1316. The claimed system is "for organizing a plurality of electrical cables," which the '291 patent indicates meet a need for "electrical cables to extend from a power or signal source to a location of application" and include DC and AC electrical cables and category five cables that convey data and control information. Ex. 1001, 1:20–56, 2:3–6, 3:58–4:2, 7:14–17.

The preamble does not recite a system for organizing a plurality of “electrical *power* cables” or particular types of electrical cables such as AC, DC, or category five electrical cables *described* in the ’291 patent. Nor do we read unclaimed features into the claim language absent a disclaimer or lexicographic definition that limits the plain meaning of the claim language. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (“Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using ‘words or expressions of manifest exclusion or restriction.’”) (citation omitted).

Patent Owner does not dispute that Carr organizes “aerial *conducting* cables” AC1, AC2 that Carr describes as creating “considerable induction effect” between parallel cables in close proximity to one another unless they are spaced apart by Carr’s hanger and loops L1, L2 to minimize this effect. Ex. 1005, 1:1:4–13 (emphasis added), 1:1:27–34, 1:2:18–27, Figs. 1–3; Prelim. Resp. 42–43; Ex. 2001 ¶¶ 155 (“Carr explicitly states that its hanger at most supports two communications cables, one cable in each surface of its hanger.”), 157 (“Carr . . . teaches a hanger device, intended for separately supporting each of a pair of monolithic telecommunications cables”); Ex. 1002 ¶ 96. The cross-induction effect between Carr’s conductor cables is similar to the interference of AC and DC electrical cables with category five electrical cables in the ’291 patent. Ex. 1001, 1:37–56; Ex. 1002 ¶ 32.

Patent Owner instead asserts that a skilled artisan would understand that “electrical cables” and, in particular, “electrical cables extending from a plurality of solar panels” are DC and AC current-carrying power cables. Prelim. Resp. 42 (citing Ex. 1001, 1:32–42); Ex. 2001 ¶ 158 (same).

Patent Owner’s assertion that a skilled artisan would understand “electrical cables extending from a plurality of solar panels” to mean only AC and DC power cables conflicts with our preliminary interpretation of “electrical cables” in Section II.B. *supra*. The ’291 patent describes three different types of “electrical cables” that extend from solar panels as (1) DC electrical cables that attach to solar panels, (2) AC electrical cables that power motors that control tracker devices that rotate solar panels to follow the sun to obtain maximum power during daylight hours, and (3) category five electrical cables and other data or control wiring that extend from the solar panel array to provide feedback to power plant operators regarding the angles that the panels are stationed and the proper angle to use to maximize power output from the sun. Ex. 1001, 1:18–62. The ’291 patent describes DC, AC, and control wiring as “electrical cables” (*id.* at 1:18–22), and we preliminarily interpret “electrical cables” to include all of these cables.

In any case, Almy organizes a plurality (bundle) of electrical cables 108, 206, 612 extending from solar panels. Ex. 1004 ¶¶ 17, 22, 34, Figs. 1, 2B, 6. Patent Owner argues only that Almy supports DC cables, not AC or any other kind of cables. Prelim. Resp. 43–44. However, claim 1 does not require a plurality of electrical cables to be AC and DC cables, or different types of electrical cables. Ex. 1001, 10:24–26. Nor do we limit this claim language to particular disclosed embodiments absent a disclaimer or a lexicographic definition. *See SuperGuide Corp. v. DirecTV Enter., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) (“[I]t is important not to import into a claim limitations that are not a part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.”).

(4) *Conclusion*

On this record, we determine that Petitioner has shown sufficiently that Carr and Almy teach or suggest element 1[a].

b. *1[b]: “a messenger wire structured to be supported a distance above the ground;”*

(1) *Petitioner’s Contentions*

Petitioner asserts that Carr renders obvious a messenger wire that is structured to be supported a distance above ground by disclosing messenger strand ST aerial cables that are used to suspend aerial conducting cables AC1, AC2. Pet. 49 (citing Ex. 1005, 1:1:1–3, 1:1:46–48, Figs. 1–3).

(2) *Patent Owner’s Arguments*

Patent Owner asserts that the claims require a messenger wire to support a plurality of hangers and plurality of cables, so the messenger wire must be sufficiently strong to support the plurality of hangers and cables, and Dr. Beik does not explain how Carr’s messenger strand would provide this support. Prelim. Resp. 45–46 (citing Ex. 2001 ¶ 171).

(3) *Analysis*

Element 1[b] recites a messenger wire but does not require a specific size or strength for the wire. It supports plural cable hangers that could be two hangers, and each hanger has “a plurality of cable carrying surfaces” that could be two surfaces that support “at least one electrical cable” that could be one cable. Ex. 1001, 10:29–34. Carr’s messenger strand supports cable hangers Y that each have two cable carrying surfaces L1, L2, and each surface supports a cable AC1, AC2. Ex. 1005, 1:2:5–53, Figs. 1–3. The ’291 patent discloses that electrical wires in solar power plants come in an almost unlimited variety of sizes and bundle sizes. Ex. 1001, 1:57–62.

(4) *Conclusion*

On this record, we determine that Petitioner has shown sufficiently that Carr discloses or suggests element 1[b].

- c. *1[c]: “a plurality of cable hangers structured to be disposed along, and suspended from, the messenger wire, each cable hanger having a plurality of cable carrying surfaces, each cable carrying surface being structured to support at least one electrical cable of the plurality of electrical cables;”*

(1) *Petitioner’s Contentions*

Petitioner asserts that Carr renders element 1[c] obvious by disclosing cable hangers that suspend aerial conducting cables from a supporting strand (messenger wire) and reduce the number of hangers required for any length of aerial conducting cable. Pet. 50–51 (citing Ex. 1005, 1:1:1–3, 1:1:27–34, 1:1:46–48, 1:2:43–53, Fig. 1). Petitioner asserts that Carr’s open loops L1, L2 each form a “cable carrying surface [] structured to support at least one conductor (electrical cable).” *Id.* at 51 (citing Ex. 1005, 1:2:17–27, Fig. 1).

(2) *Patent Owner’s Arguments*

Patent Owner contends that Carr’s “aerial conducting cables” “are lightweight cables for transmitting voice communications,” and a skilled artisan would not consider aerial conducting cables to be “electrical cables” as claimed. Prelim. Resp. 44 (citing Ex. 2001 ¶ 165). Patent Owner asserts that “Dr. Beik acknowledges that current-carrying cables are heavier than telecommunications cables, and that large bundles of current-carrying cables will deflect under load unless they are supported,” and Patent Owner argues that Dr. Beik “fails to address how *Carr’s* hangers would be suitable for supporting a plurality of electrical cables extending from solar panels.” *Id.* at 44–45 (citing Ex. 1002 ¶ 29; Ex. 2001 ¶ 166).

(3) *Analysis*

Element 1[c] requires each of the plurality of cable hangers to have “a plurality of cable carrying surfaces,” which could be two surfaces, and “each cable carrying surface [is] structured to support at least one electrical cable,” which could be a single electrical cable. Ex. 1001, 10:29–34. Carr’s cable hanger has two cable carrying surfaces L1, L2, and each surface is structured to support one aerial conducting cable AC1, AC2, as claimed. Ex. 1005, 1:2:5–53, Figs. 1–3. Element 1[c] does not require the electrical cables to be any particular size or weight, and the ’291 patent indicates that the electrical cables for solar power plants can be an almost unlimited variety of wire sizes and wire bundle sizes. Ex. 1001, 1:57–62.

Dependent claims 2–4 recite “the plurality of cable carrying surfaces comprises at least three [four, five] cable carrying surfaces.” Ex. 1001, 10:38–46. These claims indicate that a plurality of cable carrying surfaces in claim 1 may be two surfaces. The ’291 patent discloses that cable hanger 10 may have one to five cable carrier surfaces 16, 17. *Id.* at 6:19–25. Almy’s cable hanger 204B is structured to couple to wire-line 202B to support a bundle of electrical cables 206 extending from solar panels. Ex. 1004 ¶¶ 17, 22, 34, Figs. 1, 2B, 6. Its loop is structured similarly to Carr’s cable hanger and evidences that a skilled artisan would be able to configure Carr’s cable hanger to support electrical cables of varying bundle sizes similarly and both references teach materials to use. *Id.* ¶ 22; Ex. 1005, 1:1:46–51, 1:2:42–53.

(4) *Conclusion*

On this record, we determine Petitioner has shown sufficiently that Carr discloses or suggests element 1[c], and Almy provides evidence that supports this determination.

- d. 1[d]: “wherein adjacent cable carrying surfaces of the plurality of cable carrying surfaces are separated by a cable carrier divider.”*

(1) Petitioner’s Contentions

Petitioner asserts that Carr discloses element 1[d] as cable carrying surfaces L1 and L2 positioned side-by-side to support parallel-spaced cables in a horizontal plane and “separated by a cable carrier divider, shown as L3 in Figure 1.” Pet. 52 (citing Ex. 1005, 1:2:5–42, Figs. 1–3).

(2) Patent Owner’s Arguments

At this stage, Patent Owner does not contest these contentions of Petitioner regarding element 1[d]. *See generally* Prelim. Resp.

(3) Conclusion

On this record, we determine Petitioner has shown sufficiently that Carr discloses or suggests element 1[d].

- e. Secondary Considerations*

(1) Patent Owner’s Arguments

Patent Owner asserts that a declaration submitted by Allen Smith, an inventor of the ’291 patent, during prosecution attested to the investments and expenditures that were made to develop the invention and overcome industry skepticism. Prelim. Resp. 50 (citing Ex. 1015, 201–203). Patent Owner asserts that the declaration included evidence of the invention’s commercial success. *Id.* Patent Owner argues that the SolarPro article tells of the industry’s long felt need for improved cable management systems and the challenges of managing free-air conductors of a photovoltaic array in extreme environments to provide “a safe, reliable, and *Code*-compliant wire management system for exposed PV conductors.” Prelim Resp. 52 (citing Ex. 1011, 1–2).

(2) *Petitioner's Contentions*

Petitioner has not presented objective evidence of obviousness or non-obviousness or sought to address the evidence of secondary considerations presented in the Preliminary Response. *See generally* Pet.

(3) *Analysis*

Mr. Allen's testimony that sales of "product to the solar industry" rose from no sales in 2014 to over \$37,000,000 in fiscal year 2020/2021 provides evidence of commercial success of a product(s) sold by the Cambria County Association for the Blind and Handicapped ("CAB") to the solar industry. Ex. 1015, 201–202. At this stage, neither Mr. Allen nor Patent Owner has shown a nexus between these sales and the invention to establish that CAB products sold to the solar industry embodied the invention claimed in the '291 patent. *See Brown & Williamson Tobacco Corp. v. Philip Morris, Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000) (a presumption of nexus exists when a patent owner shows that the asserted objective evidence is tied to a specific product that embodies the claimed features and is coextensive with them); *see also Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373–1374 (Fed. Cir. 2019) (patent owner may prove nexus by showing that the evidence of secondary considerations directly results from the unique characteristics of the claimed invention). The current record describes the industry's need for safe, reliable, and Code-compliant wire management systems and the limits of plastic wire ties, stainless steel cable slips, and structured channels (Ex. 1011, 2; Ex. 2001 ¶¶ 62, 73–79; Ex. 1001, 2:3–20), but the current record provides little evidence that CAB products embodying the claimed cable hanger configuration satisfied this need or that the '291 patent's claimed technology received industry praise. *See* Prelim. Resp. 50–53.

f. Conclusion

Weighing all of the evidence of obviousness and non-obviousness, we determine that Petitioner has established a reasonable likelihood that it will prevail in showing that claim 1 is unpatentable over Carr and Almy because, on the current record, the evidence of obviousness outweighs the relatively weak evidence of non-obviousness provided by Patent Owner at this stage of the proceeding, particularly due to the lack of a clear nexus being established between such evidence and the claimed cable hanger system.

4. Claims 2–10, 14–22, 24, and 25

Petitioner provides detailed contentions that claims 2–10, 14–22, 24, and 25 are unpatentable over Carr and Almy. Pet. 53–76. At this stage, Patent Owner does not contest Petitioner’s contentions apart from asserting the arguments discussed above for claim 1 against elements of some of these claims. *See* Prelim. Resp. 42–50. On this record, we find that Petitioner has established a reasonable likelihood that it will prevail in showing that claims 2–10, 14–22, 24, and 25 are unpatentable over Carr and Almy.

G. Conclusion

Based on the parties’ contentions and evidence in the current record, we determine that Petitioner has established a reasonable likelihood that it will prevail in showing at least one claim of the challenged claims is unpatentable on at least one of the asserted grounds of unpatentability raised in the Petition. As a result, we institute an *inter partes* review of all challenged claims and all grounds of unpatentability raised in the Petition. *See* 37 C.F.R. § 42.108(a).

III. ORDER

Accordingly, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review is instituted as to all of the challenged claims, i.e., claims 1–10, 14–22, 24, and 25 of the '291 patent, on all of the grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial on the grounds of unpatentability authorized above; the trial commences on the entry date of this Decision.

IPR2024-00178
Patent 11,349,291 B2

PETITIONER:

Kevin Amendt
Williams Dixon
MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C.
kcamendt@mintz.com
wsdixon@mintz.com

PATENT OWNER:

Daniel Melman
Theodore McDonough
ECKERT SEAMANS CHERIN & MELLOTT LLC
dmelman@eckertseamans.com
tmcdonough@eckertseamans.com