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Paper 72
Entered: February 25, 2025

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*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Dismissing Petitioner's Motion to Strike

I. BACKGROUND

A. *History of the Proceeding*

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 B2 (“the ’291 patent”). Paper 1, 1, (“Pet.”). Cambria County Association for the Blind and Handicapped, Inc. (“Patent Owner” or “CAB”) filed a Preliminary Response. Paper 15 (“Prelim. Resp.”). Based on the preliminary record, we determined that Petitioner had shown a reasonable likelihood it would prevail in establishing the unpatentability of at least one challenged claim, and we instituted an *inter partes* review on all asserted grounds. Paper 17 (“Inst. Dec.”). During trial, Patent Owner filed a Response. Paper 32 (“PO Resp.”).¹ Petitioner filed a Reply. Paper 54 (“Reply”).² Patent Owner filed a Sur-reply. Paper 61 (“Sur-reply”).³ An oral hearing was held on January 22, 2025. A copy of the transcript is entered in the record. Paper 71 (“Tr.”).

We have jurisdiction pursuant to 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the challenged claims. Having considered the full record at trial, we determine Petitioner has shown by a preponderance of the evidence that claims 1–10, 14–22, 24, and 25 are unpatentable.

¹ Paper 32 is a publicly-available version of the PO Response. Patent Owner also filed a non-public Response. Paper 31.

² Paper 54 is a publicly-available version of the Reply. Petitioner also filed a non-public Reply. Paper 53.

³ Paper 61 is a publicly-available version of the Sur-reply. Patent Owner also filed a non-public Sur-Reply. Paper 62.

B. Related Proceedings

The '291 patent was asserted in *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. Patent Owner also asserted U.S. Patent No. 10,177,551 ("the '551 patent") in this litigation. Pet. 79; Paper 7, 1. Petitioner filed an *inter partes* review to challenge the '551 patent in IPR2024-00139. Pet. 79.

C. 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.

D. The '291 Patent

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

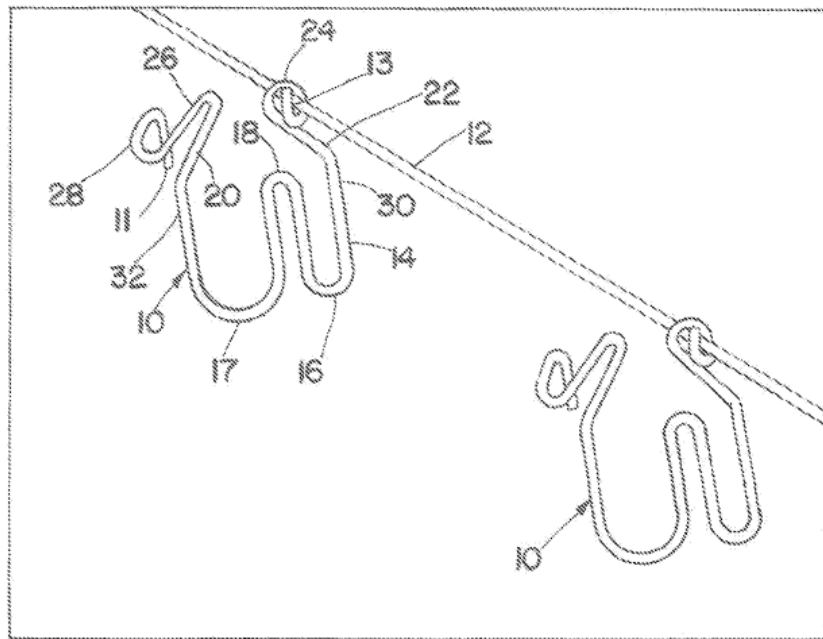


Figure 1 shows hanger 10 with cable carriers 16, 17. *Id.* at 6:18–24.

Hanger 10 also includes sides 30, 32, divider 18, and data carrier loop 28. Ex. 1001, 6:18–43, 7:10–14. Hanger 10 comprises a round or flat-rolled galvanized/stainless steel spring wire 14. *Id.* at 6:37–40. To lock hanger 10 to messenger wire 12, spiral gripper 24 engages messenger wire 12 and sides 30, 32 are squeezed together until locking hook 26 engages wire 12. *Id.* at 6:40–47. When released, locking hook 26 and gripper 24 exert a locking force on wire 12, as shown in Figure 2, reproduced below. *Id.* at 6:40–62.

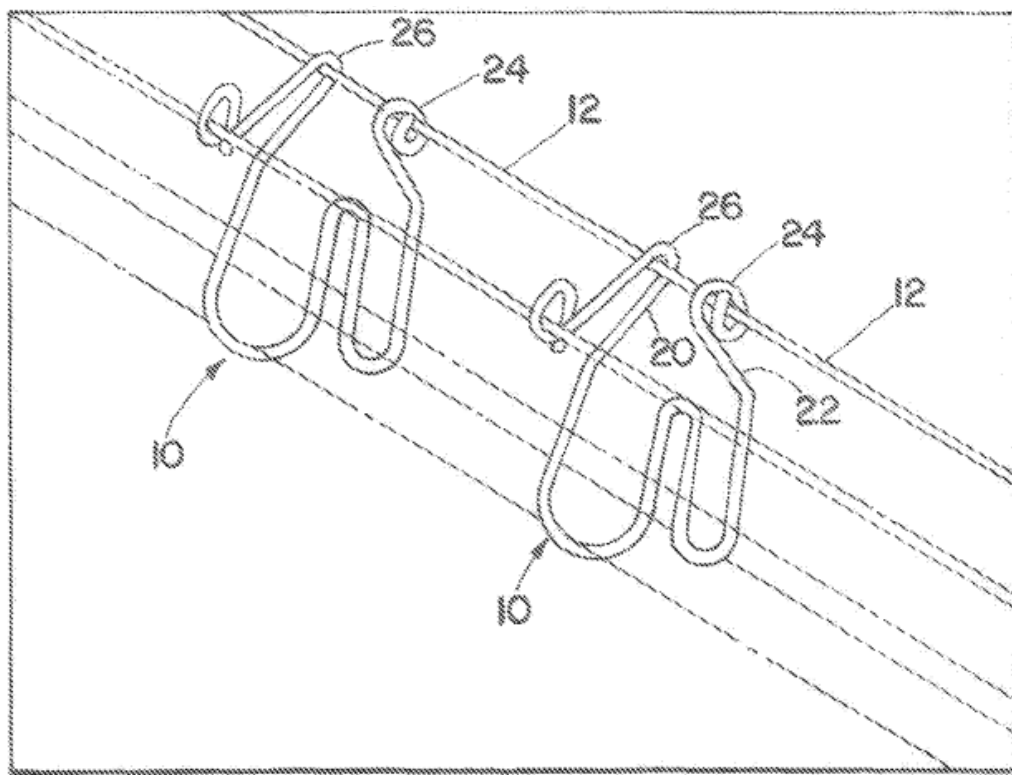


Figure 2 shows spiral gripper 24 and locking loop 26 engaging messenger wire 12. *Id.* at 6:50–62. Spiral gripper 24 includes abutment surfaces 34, 36 that engage messenger wire 12. *Id.* at 6:54–56, 7:2–10. Locking hook 26 has abutment surface 38 that engages messenger wire 12 to create a locking force on messenger wire 12 along with abutment surfaces 34, 36 on spiral gripper 24 to 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.

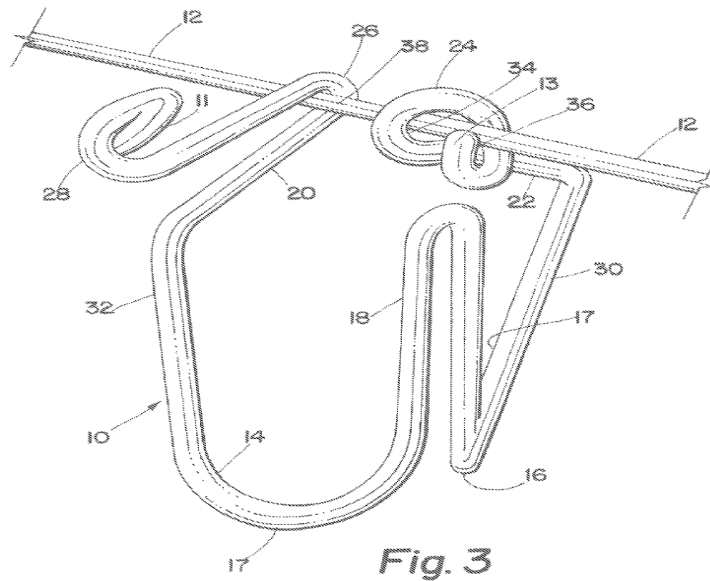


Figure 3 shows hanger 10 locked onto messenger wire 12 by abutment surfaces 34, 36 of spiral gripper 24 and abutment surface 38 of locking hook 26 to retain hanger 10 in place on wire 12. *Id.* at 2:20–46, 6:63–7:26.

B. The '291 Patent File 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 “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.

C. 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.

D. 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 ⁴	Caveney ⁵
2	14–18, 21, 22	103	Caveney, Almy ⁶
3	1–10, 14–22, 24, 25	103	Carr, ⁷ Almy

Petitioner relies on a Declaration of Dr. Omid Beik to support its Petition. Ex. 1002. Patent Owner relies on Declarations of Mitchel F. Bowman and Dr. Edward C. Kern, Jr. to support its Response. Exs. 2028, 2038. Public and non-public versions of both of these declarations are filed under these exhibit numbers.

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).

⁴ 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.

⁵ US 7,520,476 B2, issued Apr. 21, 2009 (Ex. 1003, “Caveney”).

⁶ US 2010/0139731 A1, published June 10, 2010 (Ex. 1004, “Almy”).

⁷ US 2,384,440, issued Sept. 11, 1945 (Ex. 1005, “Carr”).

Patent Owner does not offer a definition of a skilled artisan. *See* PO Resp. Having considered the record, we adopt Petitioner’s uncontested level of ordinary skill in the art as articulated above. Petitioner’s description is consistent with the cited prior art and the skill reflected in the ’291 patent specification. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (the applied prior art may reflect an appropriate level of skill).

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, words of a claim are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc).

1. “electrical cables”

In our Institution Decision, we interpreted “electrical cables” to mean “wiring that conducts current or signals.” Inst. Dec. 9. They can be AC, DC, and/or data cables. Neither party disputes that interpretation. *See* PO Resp.; Reply. We adopt that interpretation for this Decision.

2. Whether the preambles of claims 1 and 6 are limiting

Patent Owner argues that the preambles of independent claims 1 and 6 limit the scope of the invention because they recite essential structure of “a plurality of electrical cables *extending from a plurality of solar panels.*” PO Resp. 22. Patent Owner argues that the preambles provide antecedent basis for “each carrying cable surface being structured to support at least one electrical cable of *the* plurality of electrical cables’ in the body” of each claim. *Id.* at 23.

Patent Owner argues that it relied on the preambles to overcome the prior art rejection during prosecution, and the Examiner relied on the prior art's failure to teach a system for organizing a plurality of electrical cables extending from a plurality of solar panels in the reasons for allowance. PO Resp. 22–24. Patent Owner argues that this reliance on the preambles shows an intent to use the preambles to limit the scope of the claims. *Id.* at 24.

Petitioner asserts that “[e]ven if limiting, the preambles recite only an intended use, and a prior art structure that is capable of performing the intended use meets the claim.” Reply 3.

“In general, a preamble limits the invention if it recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim.” *Cochlear Bone Anchored Solutions AB v. Oticon Med. AB*, 958 F.3d 1348, 1354–55 (Fed. Cir. 2020) (quoting *Catalina Mktg. Int’l v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)).

We agree with Petitioner that the preambles of claims 1 and 6 recite an intended use. The bodies of both claims recite a structurally complete system comprising a messenger wire and a plurality of cable hangers that are disposed along and suspended from the messenger wire and have a plurality of cable carrying surfaces structured to support at least one electrical cable of the plurality of electrical cables and are separated by a cable carrier divider. Ex. 1001, 10:27–37. According to the preambles, the system are used “for organizing a plurality of electrical cables extending from a plurality of solar panels.” *Id.* at 10:24–26.

The body of each claim refers back to “a plurality of electrical cables” recited in the preamble, but the electrical cables are not claimed as part of either system. Nor are the solar panels claimed as part of either system.

During prosecution, Patent Owner argued that prior art disclosed in the “Background of the Invention” did not disclose a system for organizing electrical cables extending from solar panels comprising a messenger wire and cable hangers. Ex. 1015, 199. Patent Owner relied on a Declaration of Allen Garrett Smith, a named inventor, who testified that references in the Background of the Invention to “any use of known/existing cable hanger systems . . . utilizing a messenger wire and hangers suspended therefrom” referred to the mining and electrical industries. *Id.* 202 ¶4. These systems were *not used* in the solar industry. *Id.*

Patent Owner’s arguments made during prosecution to obtain the allowance of the ’291 patent clarified that the preambles of claims 1 and 6 recite an intended use of the systems that comprise a messenger wire and cable hangers with a plurality of cable carrying surfaces. These systems are used to support cables that extend from solar panels.

Notably, the ’291 patent lacks any description of electrical cables extending from solar panels except in the Background of the Invention. There, DC cables are described as attaching to solar panels. Ex. 1001, 1:25–27. The ’291 patent also states that AC cables power motors that control trackers that rotate the solar panels, but the AC cables are not described as extending from solar panels. *Id.* at 1:27–29. Data cables and control wiring provide feedback from a solar array as to the angles of the solar panels, but they do not extend from solar panels. *Id.* at 1:43–49. Neither the Summary of the Invention nor the Detailed Description of the Invention describes electrical cables extending from solar panels. Further, no drawings are provided of this alleged “essential structure” (PO Resp. 22) despite the requirement to show claimed subject matter (*see* 37 C.F.R. § 1.83(a)).

Nor has Patent Owner identified any disclosure in the '291 patent of electrical cables extending from solar panels except in the Background of the Invention. PO Resp. 24 (citing Ex. 1001, 1:25–62). The omission undercuts Patent Owner's argument that reciting electrical cables extending from solar panels in the preamble is essential to understanding the claimed invention.

Dr. Kern testifies that the preamble indicates the systems are used to organize electrical cables extending from solar panels. Ex. 2038 ¶ 85. He testifies that a skilled artisan would understand that the electrical cables that are organized and separated “by the recited cable hangers in the body of the claim are specifically electrical cables *extending from a plurality of solar panels.*” *Id.* Dr. Kern cites no description in the '291 patent of electrical cables extending from solar panels, however. *See* Ex. 2038 ¶¶ 84–87.

Although we interpret the preamble's recitation of “a system for organizing a plurality of electrical cables extending from a plurality of solar panels” as an intended use, our Decision would be the same even if were to find the preamble to be limiting because Almy discloses a system for organizing electrical cables extending from photovoltaic modules (solar panels) using a messenger wire and cable hangers, and Carr discloses a cable hanger system that disposes cable hangers having plural cable carrying surfaces from a messenger wire, as discussed *infra* in Section II.D. for Ground 3.

3. “*organizing a plurality of electrical cables extending from a plurality of solar panels*”

Patent Owner argues that the limitation “organizing a plurality of electrical cables extending from a plurality of solar panels” in claims 1 and 6 should have an ordinary and customary meaning of “separating the electrical cables extending from the solar panels.” PO Resp. 25 (emphasis omitted).

Petitioner asserts that Patent Owner’s construction “only replaces ‘organizing’ with ‘separating’” and “organizing” has a broader ordinary meaning than separating and includes “to arrange or order” not merely to separate. Reply 4 (citing Exs. 1052, 1053); *id.* at 5 (“Separated cables may be organized. But not all organized cables are necessarily separated.”).

We adopt Petitioner’s interpretation of “organizing” as “to arrange or order.” Reply 4. This meaning is consistent with the preamble language of “[a] system for *organizing* a plurality of electrical cables extending from a plurality of solar panels” comprising a messenger wire and cable hangers disposed along and suspended from the messenger wire with cable carrying surfaces that support electrical cables separated by a divider. Ex. 1001, 10:24–37. The system organizes electrical cables by (1) suspending them from a messenger wire on cable hangers, (2) supporting the cables on cable carrying surfaces of each cable hanger, and (3) separating the cables on adjacent cable carrying surfaces of the cable hangers by using a divider.

The “organizing” in the preamble encompasses each of these ways of arranging or ordering the electrical cables but is not limited to any particular way of doing so and merely recites an intended use of the systems. Because we interpret the preamble as reciting an intended use of the systems, we also interpret this portion of the preamble as an intended use of those systems.

Our Decision would be the same under Patent Owner’s interpretation that organizing means separating because the combination of Almy and Carr renders obvious a system for organizing electrical cables extending from solar panels by suspending them from a messenger wire on cable hangers that also separate the cables, as discussed *infra* in Section II.D. *See* Reply 12 n.4.

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 nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Petitioner bears the burden of proving the unpatentability of the challenged claims, and this burden never departs from Petitioner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

D. Ground 3: Asserted 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 hanger devices that are used for suspending aerial conducting cables from a supporting strand ST as shown in Figures 1 and 2, which are reproduced below.

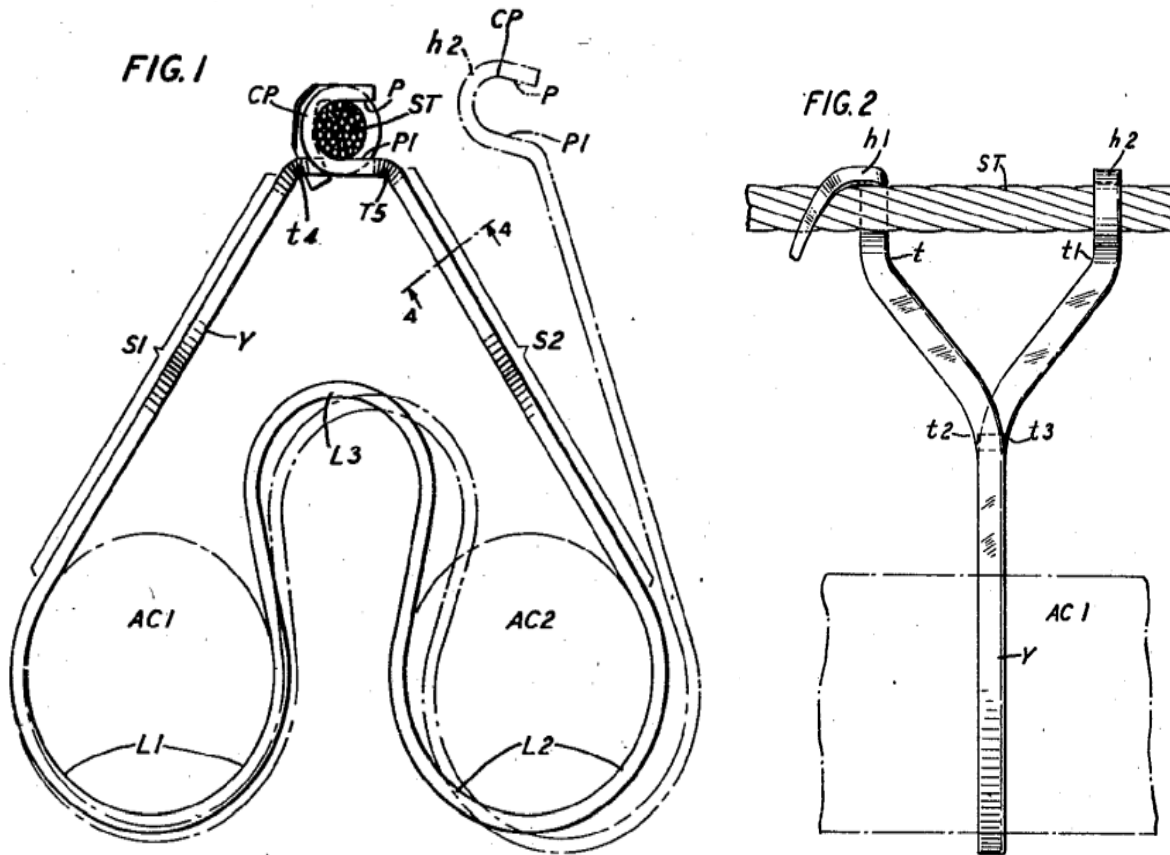


Figure 1 is a front view of the hanger device, and Figure 2 depicts a side view of this hanger when it is hooked onto supporting strand ST to support aerial conducting cables AC1, AC2 in supporting loops L1, L2 formed in the hanger wire. Ex. 1005, 1:36–49, 2:5–15. The hanger also includes inverted loop L3 formed between supporting loops L1, L2 to space conducting cables AC1 and AC2 apart at any desired separation distance, e.g., one inch, to reduce the cross-induction effect between these conductors. *Id.* at 2:23–34.

The hanger includes laminated steel strip Y with a rectangular cross-section providing considerable hardness and resiliency. Ex. 1005, 1:46–51.

Hanger Y is formed with helical-shaped hook h1 at one end to encircle supporting strand ST, hook h2 at the other end to engage strand ST, parallel sides P, P1, and semicircular portion CP having a diameter corresponding to the diameter of supporting strand ST. *Id.* at 1:51–2:4.

Strip Y of the hanger has sufficient resiliency or stiffness to require a pressure of substantially twelve pounds to flex it from a position shown in dot and dash lines to a hooked position shown in full line in Figure 1 so the diameters of loops L1, L2 fit tightly around two-thirds of the circumference of aerial cables AC1, AC2. Ex. 1005, 2:34–41. The tension to which hanger strip Y is subjected when hooked to supporting strand ST assists in preventing deformation of the 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 for each hanger, and fewer hangers required for any given length of aerial cable that is supported. *Id.* at 2:42–53.

2. *Motivation to Combine*

Petitioner asserts that a skilled artisan would have combined Carr and Almy as a routine implementation of complementary teachings that would achieve predictable results of improving wire runs in solar installations by (1) separating conductors and (2) implementing a more robust hanger. Pet. 45. Petitioner asserts that Carr recognizes the need for a hanger of simple, cheap construction that (1) can support aerial conducting cables in a spaced relation to minimize the cross-induction defect between cables and (2) can prevent the deformation of the cable hanger under the load of aerial cables. *Id.* at 45–46 (citing Ex. 1005, 1:28–34, 2:46–49; Ex. 1002 ¶ 96).

Petitioner contends that Almy is directed to supporting bundles of electrical cables and recognizes the need for a “wire-based hanging wire-way for . . . supporting a bundle of electrical cables between photovoltaic modules or module groups” using “a plurality of periodic independent wire loops” “adapted to receive a bundle of electrical cables.” Pet. 46 (quoting Ex. 1004 ¶¶ 12, 22; citing Ex. 1004 ¶ 2; Ex. 1002 ¶ 97).

Petitioner asserts that a skilled artisan would have replaced the wire loops in Almy’s solar power electrical wire-way system with Carr’s hangers to provide the known benefits of spacing apart current-carrying and non-current carrying cables to prevent cross-linking as Carr teaches and industry standards require. Pet. 46–47 (citing Ex. 1005, 1:28–34, 2:15–28; Ex. 1002 ¶¶ 98, 99). Petitioner asserts a skilled artisan would understand that Almy’s wire loops do not suspend multiple types of electrical cables in a spaced relationship to prevent cross-induction. *Id.* at 46 (citing Ex. 1002 ¶ 98 (Dr. Beik’s testimony that “wire loops are not able to provide the required distance between sets of cables for both current-carrying and non-current-carrying [cables] to prevent cross-linking as set forth in IEEE Standard 142 and NEC Rule 235G”)).

Patent Owner argues that a skilled artisan would not have replaced Almy’s wire loops with Carr’s hangers to prevent cross-induction because Almy discloses only DC power cables that extend from the photovoltaic (PV) modules to a combiner box and inverter that converts DC current to AC current without disclosing AC cables or data cables in close proximity to Almy’s DC cables that could create a cross-induction effect. PO Resp. 39–44 (citing Ex. 1004 ¶¶ 3, 15, 34, Figs. 3, 6; Ex. 2038 ¶¶ 153, 154, 157–160, 163; Ex. 2004, 85:23–86:2, 148:9–14, 154:12–19). We disagree.

We agree with Petitioner that a skilled artisan would have used Carr's cable hangers to organize electrical cables in Almy's solar power system and prevent cross-induction between AC, DC, and/or data cables. Pet. 45–46; Reply 12–13; Ex. 2001 ¶¶ 53–55. A skilled artisan would know that Carr's cable hangers would improve Almy's solar power system by supporting AC, DC, and/or data cables without cross-induction. Pet. 46; Reply 13; Ex. 1002 ¶¶ 48, 96–99; Ex. 1005, 1:27–34, 2:15–27, Fig. 1. Carr's hangers would satisfy regulations requiring AC and DC cables to be separated. Reply 13.

Because Almy's wire loops cannot comply with NEC regulations that require the separation of AC, DC, and data cables, they limit the ability of Almy's system to power trackers with AC current to move PV modules to track the sun and obtain maximum power. Ex. 1001, 1:20–56; PO Resp. 7–8 (describing the solar industry trend to use trackers and NEC rules requiring separation of AC, DC, and signal cables for such systems). Carr's hangers would enable Almy's solar power system to organize AC, DC, and data cables for solar panels and trackers on a single messenger wire to increase efficiency, comply with NEC rules, prevent cross induction, and avoid the costs of trenching and cable trays. Reply 12–13; Pet. 45–47; Ex. 1005, 1:27–34 (Carr's cable hangers separate arial conducting cables to minimize cross induction); Ex. 1002 ¶¶ 32–36 (describing the benefits of separating electrical cables with hangers), 48, 96–98 (wire loops cannot prevent cross induction between current- and non-current-carrying cables as hangers do); Ex. 2001 ¶¶ 53–55 (NEC rules require separation of AC, DC, and signal cables); *see Metso Mins., Inc. v Powerscreen Int'l Distrib.*, 526 F. App'x 988, 997 (Fed. Cir. 2013) (finding a motivation to combine to create a solution that complies with road permit regulations).

Carr's hangers would provide a simple, robust means to support and separate current- and non-current-carrying cables to prevent cross induction without deforming under load in Almy's solar power system. *See KSR*, 550 U.S. at 417 (“[I]f 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.”); *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023) (citing *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 799–800 (Fed. Cir. 2021)) (“This is the so-called ‘known-technique’ rationale. And if there’s a known technique to address a known problem using ‘prior art elements according to their established functions,’ then there is a motivation to combine.”); *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006) (an implicit motivation to combine exists when a combination produces a stronger, cheaper, faster, lighter, smaller, more durable, and/or more efficient product); Ex. 1002 ¶¶ 32 (IEEE Standard 142 and NSC Rule 235G require spacing of current-carrying and data cables to avoid cross-linking), 42 (2014 NEC spacing requirements), 96–99 (Carr’s hangers support and space conducting cables to prevent cross-linking).

Carr’s teachings are consistent with Almy’s hanging wire-way system that enables flexible designs of solar power systems and customizable support for electrical cables. Ex. 1004 ¶¶ 14, 15. Carr’s multi-cable carrier would improve the efficiency and flexibility of Almy’s system by supporting AC and DC electrical cable bundles from the same hangers and messenger wire, obviating the need to provide separate messenger wires and wire loops for each type of electrical cable to prevent cross-linking. Ex. 1002 ¶¶ 96–99.

Almy's system has a PV module tracker that can be powered by AC or DC cables. *See* PO Resp. 42 (citing Ex. 1004 ¶¶ 3, 15, Fig. 3; Ex. 1038 ¶ 160). Carr's cable hangers would separate AC and DC cables extending from Almy's array of PV modules and trackers to prevent cross-linking as is known in the art. Ex. 1001, 1:20–56; Ex. 1002 ¶¶ 32, 96–99; Pet. 5–8. We do not credit Dr. Kern's testimony that the tracker cables are not in the solar array (Ex. 2038 ¶ 160) because Almy's trackers are attached directly to solar cells 304 from which DC cables extend. Ex. 1004 ¶¶ 24, 34, Figs. 3, 6. Figure 6 of Almy shows DC cables 612 separated on hangers 614, 616, 618 (Ex. 1004 ¶ 34) consistent with prior art teachings to separate conducting cables. Ex. 1002 ¶ 32 (citing Ex. 1019, 87–104, Figs. 2, 3 (conductors are spaced to avoid cross-linking); Ex. 1020, 1; Ex. 1001, 1:32–41, 2:3–6); Ex. 1013, 2:16–19. Carr's hangers would suspend separated AC, DC, and data cables from the same messenger wire unlike wire loops. Ex. 1002 ¶ 46.

Carr's wire hanger is “constructed of a laminated steel strip Y . . . of rectangular cross-section having considerable hardness and resiliency.” Ex. 1005, 1:46–51. Its resiliency and stiffness require significant pressure to be used to attach it to a messenger wire while preventing deformation and cross-induction. *Id.* at 2:34–47. Its robust design allows the use of metallic strips of smaller cross-section to save materials and reduce the number of hangers needed to support a cable. *Id.* at 2:49–53; *see also* Ex. 1002 ¶ 29 (describing the need for hangers to support cables). A skilled artisan, who is not an automaton, would strengthen Carr's hangers to support cable bundles of heavier weight. *See* Ex. 1005, 2:42–53. Carr suggests as much by disclosing a steel strip of smaller cross-sectional area can be used in some cases. *Id.*; *see* Reply 14. Larger cross sections could be used as needed.

Carr's hangers can be installed at a desired interval along a messenger wire simply by flexing and releasing the hanger to secure it to the wire with cables secured inside it. Ex. 1005, 2:28–41. This design provides flexibility in spacing cable hangers to support electrical cables of varying weight. In contrast, Almy's wire loops are formed from, or coupled to, wire-line 204A, 204B with less flexibility in spacing. Ex. 1004 ¶¶ 20, 22, Figs. 2A, 2B.

We are not persuaded that Almy's wire loops support heavier weight DC cables than Carr's hangers. PO Resp. 47; Ex. 2038 ¶ 172. Almy's wire loops do not have to support a particular number or weight of cables; they may support one or more electrical cables. Ex. 1004 ¶¶ 15, 17; Reply 14. Nor do Carr's hangers have to be better in all respects because they would support AC, DC, or data cables reliably in a spaced relation as Carr teaches. Pet. 46; Reply 14; Ex. 1005, 1:46–51; 2:15–42; *see Intel*, 21 F.4th at 800 (“It’s not necessary to show that a combination is ‘the *best* option, only that it be a *suitable* option.’”) (citation omitted).

We agree with Petitioner that the simple, cheap construction of Carr's hangers means they are inexpensive but robust because of their considerable hardness, resiliency, and rectangular cross section, as Dr. Kern testifies, and they can support heavier cable bundles, either by using more hangers or by increasing their thickness and strength. Reply 14; Ex. 1005, 1:46–51, 2:43–53. Carr's disclosure that fewer hangers are needed for a given cable length also indicates that the hangers provide a robust design. Ex. 1005, 2:50–53.

Having considered the parties' arguments and evidence, we determine Petitioner has demonstrated by a preponderance of evidence that a skilled artisan would have been motivated to combine the known techniques of Carr with Almy in the manner asserted for predictable results and improvements.

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:*

Petitioner asserts that Carr discloses a system of organizing electrical cables by using cable hangers suspended from a messenger wire. Pet. 47–48 (citing Ex. 1005, 1:1–3, 1:27–34, Figs. 1–3). Petitioner asserts that Almy organizes electrical cables extending from solar panels, and a skilled artisan wanting to organize electrical cables extending from solar panels would use Carr’s cable management system for Almy’s system to minimize the cross-induction effect between cables and organize the cables. *Id.* at 48–49 (citing Ex. 1004 ¶ 2; Ex. 1002 ¶ 101; Ex. 1001, 1:18–22). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments and find that Petitioner has shown that the combination of Carr and Almy renders the preamble obvious even if we consider the preamble to be limiting as Patent Owner argues it should be. *See* Ex. 1005, 1:1–3, 1:27–34, Figs. 1–3; Ex. 1004 ¶ 2.

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

Petitioner asserts that Carr renders element 1[b] obvious by disclosing a messenger wire (supporting strand ST) that supports “aerial” cables AC1, AC2, meaning that the messenger wire is structured to be supported a distance above the ground as shown in Figures 1–3. Pet. 49 (citing Ex. 1005, 1:1–3, 1:46–48, Figs. 1–3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr discloses and renders obvious element 1[b]. *See* Ex. 1005, 1:1–3, 1:46–48, Figs. 1–3.

- 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;*

Petitioner asserts that Carr renders element 1[c] obvious by disclosing cable hangers that suspend aerial conducting cables from a supporting strand. Pet. 50–51 (citing Ex. 1005, 1:1–3, 1:27–34, 1:46–48, 2:43–53, Fig. 1). Petitioner asserts that open loops L1, L2 are cable carrying surfaces structured to support at least one conductor. *Id.* at 51 (citing Ex. 1005, 2:17–27, Fig. 1). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find Petitioner has shown that Carr renders element 1[c] obvious. *See* Ex. 1005, 1:1–3, 1:27–34, 1:46–48, 2:15–27, 2:43–53.

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

Petitioner asserts that Carr discloses cable carrying surfaces L1, L2 that support cables side-by-side and separated by cable carrier divider L3. Pet. 52 (citing Ex. 1005, 2:5–42, Figs. 1–3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr discloses element 1[d]. *See* Ex. 1005, 2:5–42, Figs. 1–3.

- e. Conclusion*

We find that Petitioner has shown claim 1 is unpatentable over the combination of Carr and Almy notwithstanding Patent Owner’s alleged objective indicia of nonobviousness, discussed below.

4. *Independent Claim 6*

a. *6[a]–6[c]*

Petitioner contends that Carr and Almy render these elements obvious for the reasons asserted for elements 1[a]–1[c]. Pet. 53 (citing contentions for elements 1[a]–1[c] in Ground 3). Patent Owner does not dispute these contentions. *See* PO Resp. We find that Petitioner has shown that Carr and Almy render elements 6[a]–6[c] obvious for the reasons provided for elements 1[a]–1[c]. *See* Pet. 47–51.

b. *6[d]: a high tensile strength wire with two opposing ends and configured intermediate of said ends to form a plurality of substantially U-shaped configurations each having a cable carrying surface of the plurality of cable carrying surfaces located thereon;*

Petitioner asserts that Carr renders element 6[d] obvious by disclosing a laminated steel strip having considerable hardness and resiliency with two opposing ends and U-shaped cable carrying surfaces L1, L2 intermediate the ends to support cables AC1, AC2. Pet. 53–55 (citing Ex. 1005, 1:46–2:31, annotated Fig. 1; Ex. 1002 ¶ 114). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find Petitioner has shown that Carr renders element 6[d] obvious. *See* Ex. 1005, 1:46–2:42, Figs. 1–3.

c. *6[e]: outermost lateral spaced apart opposing sides forming the boundary of said hanger;*

Petitioner contends that Carr renders element 6[e] obvious. Pet. 55–56 (citing Ex. 1005, annotated Figs. 1, 3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders element 6[e] obvious. *See* Ex. 1005, Figs. 1–3.

- d. 6[f]: opposite shoulders extending toward each other from said spaced apart opposite sides, each of said shoulders having an arrangement structured to engage the messenger wire so as to securely hold the hanger on the messenger wire.*

Petitioner contends that Carr discloses element 6[f] as strip Y bent to form sides S1, S2 with open loops L1, L2 at one end and hooks h1, h2 at opposite ends to engage and securely hold onto messenger wire ST. Pet. 56–58 (citing Ex. 1005, 2:15–20, 2:28–41, annotated Figs. 1–3). Patent Owner does not dispute these contentions. See PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find Petitioner has shown that Carr discloses element 6[f]. See Ex. 1005, 2:15–41, Figs. 1–3.

e. Conclusion

Petitioner has shown claim 6 is unpatentable over the combination of Carr and Almy, notwithstanding Patent Owner’s alleged objective indicia of nonobviousness, discussed below.

5. Independent Claim 14

a. 14[a]: A solar plant comprising:

Petitioner contends that Almy renders element 14[a] obvious by disclosing a plurality of PV modules, cabling, and a system for organizing the cabling and that a skilled artisan would have combined Almy and Carr to organize and support a plurality of electrical cables in a solar plant. Pet. 58–59 (citing contentions for element 14[a] in Ground 2; Ex. 1002 ¶ 123; Ex. 1001, 1:18–22). Patent Owner does not dispute these contentions. PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Almy renders element 14[a] obvious. Pet. 39–40 (citing Ex. 1004 ¶¶ 3, 4, 12, Fig. 1; Ex. 1002 ¶¶ 80–82; Ex. 1001, 1:18–22).

b. 14[b]: a plurality of solar panels;

Petitioner contends that Almy renders element 14[b] obvious for the reasons provided in Ground 2. Pet. 59 (citing contentions for element 14[b] in Ground 2). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner's evidence and arguments, and we find that Petitioner has shown that Almy renders element 14[b] obvious. *See* Ex. 1004, Fig. 1 (PV modules 102, 104, 110); Pet. 40.

c. 14[c]: a plurality of electrical cables extending from the plurality of solar panels; and

Petitioner contends that Almy renders element 14[c] obvious for the reasons provided in Ground 2. Pet. 59 (citing contentions for element 14[c] in Ground 2). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner's evidence and arguments, and we find that Petitioner has shown that Almy renders element 14[c] obvious. *See* Ex. 1004, Fig. 6; Pet. 40–41.

d. 14[d]–14[g]

Petitioner contends that Carr and Almy render elements 14[d]–14[g] obvious for reasons asserted for elements 1[a]–1[d] above. Pet. 60. Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner's evidence and arguments, and we find that Petitioner has shown that Carr and Almy render elements 14[d]–14[g] obvious. *See* Ex. 1004, Fig. 6; Pet. 47–53.

e. Conclusion

Petitioner has shown claim 14 is unpatentable over the combination of Carr and Almy, notwithstanding Patent Owner's alleged objective indicia of nonobviousness, discussed below.

6. *Independent Claim 19*

a. *19[a]–19[c]*

Petitioner asserts that Almy renders elements 19[a]–19[c] obvious. Pet. 60 (citing contentions for elements 14[a]–14[c] in Grounds 2 and 3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments and find Petitioner has shown that Almy renders elements 19[a]–19[c] obvious. *See* Pet. 39–41, 58–59.

b. *19[d]–19[e]*

Petitioner asserts that Carr and Almy render elements 19[d]–19[e] obvious. Pet. 60 (citing contentions for elements 1[b]–1[c] in Ground 3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find Petitioner has shown Carr and Almy render elements 19[d]–19[e] obvious. *See* Pet. 49–51.

c. *19[f]*

Petitioner contends that Carr renders element 19[f] obvious for the reasons asserted for element 1[c]. Pet. 61 (citing contentions for element 14[f] in Grounds 2 and 3 and element 1[c] in Ground 3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments and find that Petitioner has shown that Carr renders element 19[f] obvious. *See* Pet. 41, 50–51, 60.

d. *19[g]–19[i]*

Petitioner asserts that Carr renders elements 19[g]–19[i] obvious. Pet. 61 (citing contentions for elements 6[d]–6[f]). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders elements 19[g]–19[i] obvious. *See* Pet. 53–58.

e. Conclusion

Petitioner has shown claim 19 is unpatentable over the combination of Carr and Almy, notwithstanding Patent Owner's alleged objective indicia of nonobviousness, discussed below.

7. Independent Claim 24

a. 24[a]–24[c]

Petitioner asserts that Carr and Almy render elements 24[a]–24[c] obvious for the reasons asserted for analogous elements 1[a]–1[c]. Pet. 62 (citing contentions for elements 1[a]–1[c]). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner's evidence and arguments, and we find that Petitioner has shown that Carr and Almy render elements 24[a]–24[c] obvious. *See* Ex. 1004 ¶¶ 2, 3, 12, Fig. 6; Ex. 1005, 1:46–48, 2:5–41, Figs. 1–3; Pet. 47–51.

b. 24[d]: providing a first electrical cable of the plurality of electrical cables in engagement with a first cable carrying surface of each cable hanger of the plurality of cable hangers; and

Petitioner asserts that Carr renders element 24[d] obvious by placing first cable AC1 of a plurality of cables AC1, AC2 in engagement with first cable carrying surface L1 of the cable hanger to fit tightly around two-thirds of the circumference of cable AC1. Pet. 62–63 (citing Ex. 1005, 2:34–41, annotated Figs. 1, 3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner's evidence and arguments, and we find that Petitioner has shown that Carr renders element 24[d] obvious. *See* Ex. 1005, 2:15–42, Figs. 1, 3.

- c. 24[e]: providing a second electrical cable of the plurality of electrical cables in engagement with a second cable carrying surface of each cable hanger of the plurality of cable hangers, wherein each cable hanger of the plurality of cable hangers comprises:*

Petitioner asserts that Carr renders element 24[e] obvious by teaching an engaging of second cable AC2 with second cable carrying surface L2. Pet. 63–64 (citing Ex. 1005, 2:34–41, annotated Figs. 1, 3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find Petitioner has shown that Carr element 24[e] obvious. *See* Ex. 1005, Figs. 1–3.

- d. 24[f]–24[h]*

Petitioner asserts that Carr renders elements 24[f]–24[h] obvious. Pet. 65 (citing contentions for elements 6[d]–6[f]). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders elements 24[f]–24[h] obvious. *See* Ex. 1005, 1:46–2:31; Pet. 53–58.

- e. 24[i]: wherein the method further comprises, for each cable hanger, bringing the arrangement of one of the shoulders of the cable hanger into engagement with the messenger wire after providing at least the first electrical cable of the plurality of electrical cables in engagement with the first cable carrying surface.*

Petitioner asserts that Carr renders element 24[i] obvious by engaging shoulder h2 with the messenger wire as surfaces L1, L2 engage cables AC1 and AC2. Pet. 65–66 (citing Ex. 1005, 2:34–41, annotated Fig. 1). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders element 24[i] obvious. *See* Ex. 1005, 2:29–53, Fig. 1.

f. Conclusion

Petitioner has shown claim 24 is unpatentable over the combination of Carr and Almy, notwithstanding Patent Owner's alleged objective indicia of nonobviousness, discussed below.

8. Dependent claims 2–4 and 15–17: wherein the plurality of cable carrying surfaces comprises at least three/four/five cable carrying surfaces.

Petitioner contends that Carr renders claims 2–4 and 15–17 obvious by teaching a system that organizes a plurality of electrical cables with cable hangers suspended from a messenger wire and having plural cable carrying surfaces. Pet. 66–67 (citing Ex. 1005, 1:1–3, 1:27–34). Petitioner asserts that a skilled artisan would have modified Carr's cable hanger to support three/four/five cables. *Id.* at 67–68 (citing Ex. 1002 ¶ 154). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner's evidence and arguments, and we find that Petitioner has shown that Carr renders claims 2–4 and 15–17 obvious in combination with Almy. *See* Ex. 1005, 1:27–34, 2:15–53, Fig. 1; Ex. 1002 ¶ 154.

9. Claims 5 and 18: wherein the cable divider extends vertically.

Petitioner contends that Carr discloses this limitation in claims 5 and 18 and renders it obvious as a cable hanger that supports plural conducting cables with cable carrying surfaces L1, L2 positioned side-by-side in a spaced relationship by a vertically extending cable carrier divider (loop L3) shown in Figure 1. Pet. 68–69 (citing Ex. 1005, 1:1–3, 1:23–34, Figs. 1–3). Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner's evidence and arguments, and we find that Petitioner has shown that Carr discloses and renders obvious claims 5 and 18 in combination with Almy. *See* Ex. 1005, 1:27–34, 2:28–42, Fig. 1.

- 10. Claim 7: wherein the arrangement of one of the shoulders that is structured to engage the messenger wire is a spiral gripper formation and the arrangement of the other shoulder that is structured to engage the messenger wire is a locking hook.*

Petitioner asserts that Carr renders claim 1 obvious by engaging messenger wire ST with “helical-shaped hook portion *h1*” that is a spiral gripper at one end and “hook portion *h2*” that is a locking hook at the other end. Pet. 69–71 (citing Ex. 1005, 1:51–2:53, Figs. 2, 3). Patent Owner does not dispute these contentions. See PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders claim 1 obvious in combination with Almy. See Ex. 1005, 1:51–2:53, Fig. 1–3.

- 11. Claims 8 and 20: wherein each cable hanger of the plurality of cable hangers comprises a wire selected from the group of round galvanized steel, round stainless steel, flat rolled galvanized steel, flat rolled stainless steel.*

Petitioner asserts that Carr discloses a “steel strip” with a rectangular cross section and considerable hardness and resiliency and that a skilled artisan would have understood Carr to disclose a “flat rolled” steel strip and render obvious the “round steel” limitations. Pet. 71 (citing Ex. 1005, 1:46–51; Ex. 1002 ¶ 160). Petitioner asserts that Almy discloses cable carrying loops of galvanized steel and stainless steel and that a skilled artisan would have understood Almy to disclose round, galvanized, and stainless steel and to render obvious flat rolled steel. *Id.* at 71–72 (citing Ex. 1004 ¶ 20; Ex. 1002 ¶ 161)). Patent Owner does not dispute these contentions. See PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders claims 8 and 20 obvious in combination with Almy. See Ex. 1004 ¶ 20; Ex. 1005, 1:46–51.

- 12. Claims 9 and 21: further comprising a data carrier associated with the plurality of solar panels, and wherein each cable hanger of the plurality of cable hangers further comprises a formation structured to support the data carrier [along the messenger wire].*

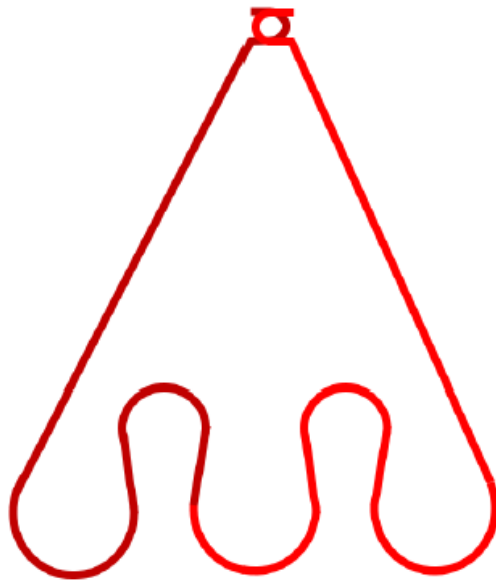
Petitioner asserts that Carr renders claims 9 and 21 obvious by disclosing a cable hanger comprising plural cable carrying surfaces, each of which can support a data carrier separately from current carrying cables and that a skilled artisan would have understood to position a data carrier sufficiently separately from current carrying cables on cable carrying surfaces L1, L2 to limit cross-induction. Pet. 72–73 (citing Ex. 1005, 2:23–27, Fig. 1). Patent Owner does not dispute these contentions. See PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders claims 9 and 21 obvious in combination with Almy. See Ex. 1005, 2:23–27, Fig. 1.

- 13. Claims 10 and 22: wherein the formation structured to support the data carrier is positioned closer to the messenger wire than the cable carrying surfaces.*

Petitioner contends that Carr discloses a cable hanger with a formation structured to support a data carrier and that it would have been obvious to position the data carrier closer (i.e., higher) to the messenger wire than the current carrying cables to minimize interferences from the current carrying cables as Carr discloses by maximizing the distance between the data carrier and current carrying cables. Pet. 74 (citing contentions for claims 9 and 21; Ex. 1005, 1:27–34; Ex. 1002 ¶ 166). Patent Owner does not dispute these contentions. See PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders claims 10 and 22 obvious in combination with Almy. See Ex. 1005, 1:27–34.

14. *Claim 25: “further comprising providing a third electrical cable of the plurality of electrical cables in engagement with a third cable carrying surface of each cable hanger of the plurality of cable hangers.*

Petitioner asserts that Carr teaches a system of organizing a plurality of electrical cables with cable hangers suspended from a messenger wire having a plurality of cable carrying surfaces. Pet. 75 (citing Ex. 1001, 1:1–3, 1:27–34). Petitioner contends that a skilled artisan would have found it obvious to modify Carr to accommodate additional cables by including a third cable carrying surface for engaging a third electrical cable as required by claim 25 and as illustrated below. *Id.* at 75–76 (citing Ex. 1002 ¶¶ 168, 169).



The figure above depicts Petitioner’s contentions of a modification of Carr’s cable hanger to include a third cable carrying surface. *Id.* at 75–76. Patent Owner does not dispute these contentions. *See* PO Resp. We have reviewed Petitioner’s evidence and arguments, and we find that Petitioner has shown that Carr renders claim 25 obvious in combination with Almy. *See* Ex. 1005, 1:27–34, Figs. 1–3.

15. *Secondary Considerations*

a. *Alleged Nexus to Commercial Products and Systems*

Patent Owner argues that CAB’s “Standard System” is coextensive with claims 1 and 6 of the ’291 patent so a nexus is presumed. PO Resp. 50 (citing Ex. 2038 ¶¶ 180–197, App. A). Dr. Kern testifies that the Standard System includes mid pier kits, end pier kits, a galvanized steel messenger wire, and cable hangers that are coextensive with claims 1 and 6 of the ’291 patent. Ex. 2038 ¶¶ 180–197, App. A. Dr. Kern testifies that he obtained photographs of CAB’s Standard System from a photo gallery on CAB’s Solar website. *Id.* ¶ 183. He testifies that he obtained a copy of CAB’s Installation Guide (Ex. 2041) with instructions for installing CAB’s Standard System and photographs of installed systems. *Id.* ¶ 184. Dr. Kern sets forth his analysis in Appendix A to show CAB sells a standard messenger wire and cable hanger system that is coextensive with claims 1 and 6 of the ’291 patent. *Id.* ¶¶ 188–197, App. A.

Petitioner argues that Patent Owner provides no evidence the Standard System practices the challenged claims beyond listing five part numbers for products reviewed in Dr. Kern’s declaration. Reply 16–18. We agree.

The cable hangers and messenger wire analyzed by Dr. Kern appear to be covered by claims 1 and 6 of the ’249 patent. *See* Ex. 2038 ¶¶ 180–197, App. A. Dr. Kern identifies two part numbers as “representative of the cable hangers in CAB’s Standard System,” but he does not indicate which, if either, of these parts are analyzed in Appendix A. *Id.*, A5–A6 (citing a CAB quote for a customer that includes these cable hanger part numbers with pier kits and a messenger wire (Ex. 2042)); Reply 19. Nor does the CAB quote cited by Dr. Kern identify these parts as a “Standard System.” Ex. 2042.

Even if CAB sells messenger wires, cable hangers, and pier kits as a system, the pier kits and piles, to which they attach a messenger wire, are not asserted to be covered by claims 1 and 6. PO Resp.; Sur-reply; Ex. 2038 App. A. Its sells “1 Carrier Hangers” that are not claimed. *Id.* at 5. It sells “Rings” and “J Hooks” that are not claimed. *Id.* at 13–14; Ex. 1056, 1–6; Reply 25. Nor did Dr. Kern show the messenger wire and cable hangers he analyzed formed a specific standard system sold by CAB. Ex. 2046, 4–12.

CAB sells messenger wires, hangers, and pier kits separately. It sells pier kits and hangers without messenger wires. Ex. 1056, 1 (3383). It sells pier kits without messenger wires or hangers. *Id.* (126, 2911, 3226). It sells messenger wires and pier kits without hangers. *Id.* 1–2 (3402, 3407, 3393).

Patent Owner admits that its Standard System includes “hundreds of combinations of dozens of components.” Sur-reply 13. Patent Owner has not shown any of these combinations are sold as a standard system product that is coextensive with claims 1 and 6 of the ’291 patent. Ex. 2038 ¶¶ 180–197, App. A; PO Resp. 50. Nor has Patent Owner established that any other components or combinations of the Standard System are comparable to the single embodiment of a Standard System that Dr. Kern found to be coextensive with claims 1 and 6. *See* PO Resp. 50; Sur-reply 12–13; Reply 25. Sales of rings and J Hook hangers are not covered by the ’291 patent. Reply 25 (citing Ex. 2044, App. 2.2). Sales of other multi-carrier hangers were not shown to be sold as a standard system product that is coextensive with claims 1 and 6. Ex. 2046; Ex. 2056. To the extent other cable hangers embody designs in Figures 14–17 of the ’291 patent, Dr. Kern did not show these hangers are comparable to the three-carrier hanger he analyzed or that they are sold as a standard system product. Ex. 2038 ¶¶ 180–197, App. A.

Patent Owner admits the Standard System has “multi-carrier cable hangers of various configurations” (PO Resp. 50 n.2) but does not show that these configurations are covered by claims 1 and 6 (*see id.*). Ms. Studinary, CAB’s Vice President of Finance, testifies that Exs. 2046 and 2056 show sales of *components* of CAB’s standard system. Ex. 2058 ¶ 7. She does not address whether these components are sold as a standard system covered by claims 1 and 6. *See* Sur-Reply 13 (citing Ex. 2058 ¶¶ 2–8).

Patent Owner asserts that differences among its messenger wires and cable hangers relate to different wire sizes, compositions, and numbers of cable-carrying surfaces, but Patent Owner does not show that any of these different messenger wires and cable hangers are covered by claims 1 and 6. Sur-reply 14. Nor does Patent Owner show that any other cable hangers and messenger wires are comparable to the messenger wire and cable hanger that Dr. Kern analyzed or show how his analysis applies to other configurations. In short, Patent Owner has not shown how Dr. Kern’s analysis of a single messenger wire and cable hanger establishes that different cable hangers and messenger wires are coextensive with claims 1 and 6.

In sum, we find that Patent Owner has not shown a nexus between the many different messenger wires and cable hangers that it sells and claims 1 and 6 or that these components are sold as a standard system covered by claims 1 and 6. Dr. Kern’s analysis of a single messenger wire and cable hanger does not address whether CAB’s sales of many other components, separately and in different combinations, still comprise a Standard System that is covered by claims 1 and 6. We consider the nexus of CAB’s other products to claims 1 and 6 of the ’291 patent in the context of each secondary consideration presented by CAB and discussed below.

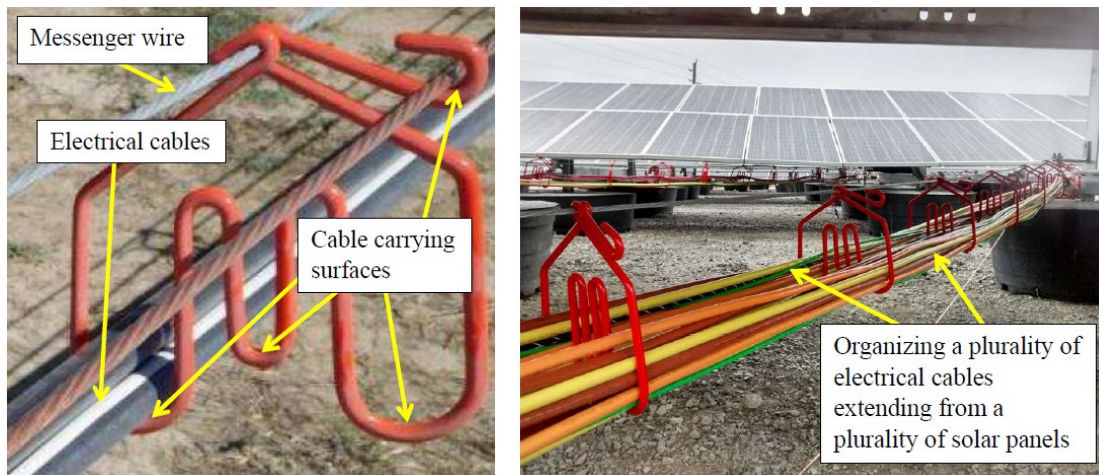
b. Alleged Copying

Mr. Smith asserts that he and another CAB employee (Tim Wedding) met with Jeff Lamb, a manager at First Solar, and Daniel R. Smith, a First Solar engineer, on March 19, 2015, to discuss using CAB's above-ground cable management system. Ex. 2006 ¶ 49; PO Resp. 51. Mr. Smith testifies that he reviewed designs and features of CAB's solar hangers and "shared CAB's proprietary drawings and designs, including the design of the two-carrier solar hanger" but he does not provide copies of drawings, designs, or products that were shared with First Solar. Ex. 2006 ¶ 49. Patent Owner asserts the material "include[d] engineering drawings" but does not provide copies of the engineering drawings shared with First Solar. PO Resp. 51–52.

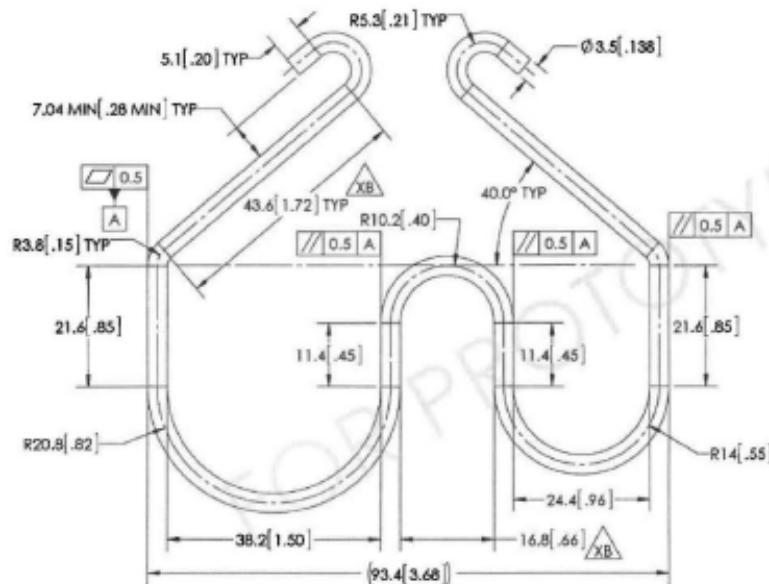
Mr. Smith testifies that Tim Wedding received a September 15, 2015, email from a company asking CAB to bid for two million hangers for a First Solar project. Ex. 2006 ¶ 51. The email attached a First Solar drawing that specified the dimensions of the requested hanger, and Mr. Smith testifies that "the hanger depicted in the drawing was essentially identical, with the exception of a few minor adjustments in dimensions, to the CAB two-carrier hanger that CAB had shared with First Solar in March 2015." *Id.*; Ex. 2013; PO Resp. 52 ("The hanger depicted in the drawing was essentially identical, with the exception of a few minor adjustments in dimensions, to the CAB two-carrier hanger that CAB shared with First Solar in March 2015.").

Petitioner argues persuasively that "none of the cited emails include any representations of the designs allegedly shared with First Solar" and that "CAB asks the Board to adopt their unsupported conclusion that the First Solar drawing was 'essentially identical' to a design CAB allegedly shared." Reply 22–23.

To show nexus, Patent Owner relies on Dr. Kern’s analysis of a CAB three-carrier hanger and messenger wire as coextensive with claims 1 and 6 of the ’291 patent. PO Resp. 50 (citing Ex. 2038 ¶¶ 180–197, App. A). We reproduce part of Dr. Kern’s nexus analysis below to illustrate that design.



The three-carrier hangers support electrical cables from a messenger wire as shown in CAB’s Solar Installation Guide and Dr. Kern’s nexus analysis. Ex. 2041, 2; Ex. 2038, A2, A5–A6. We reproduce a First Solar drawing that allegedly copies a CAB cable hanger design that was shared with First Solar.



This drawing shows a two-cable hanger. Ex.2013, 2; Sur-reply 18.

Even if the hanger in the First Solar drawing is “essentially identical” to a hanger CAB shared with First Solar (Ex. 2006 ¶ 51; PO Resp. 52), it is a two-hanger design. Dr. Kern analyzed a three-carrier hanger and messenger wire to show a nexus to claims 1 and 6 of the ’291 patent. Ex. 2038 ¶¶ 180–197, App. A. Dr. Kern did not establish a nexus between any of CAB’s two-carrier hangers and claims 1 and 6. *Id.* Nor is a two-carrier hanger, by itself, coextensive with the *system* of claims 1 and 6 that comprises a messenger wire *and* cable hangers. Mr. Smith did not provide CAB part numbers or engineering drawings of the cable hangers that he shared with First Solar. *See* Ex. 2006 ¶¶ 50, 51. Nor did Mr. Smith establish a nexus to the cable carriers that he shared with First Solar. *See id.*; Reply 22–23.

In its Sur-reply, Patent Owner provides a two-carrier hanger design that was available in September 2014. Sur-reply 17 (citing Ex. 1032, 13). That design is similar to Figure 1 of the ’291 patent, but we have no evidence that Mr. Smith provided this cable hanger design to First Solar. Nor is this design “essentially identical” to First Solar’s two-cable carrier design that allegedly copied a CAB design. *See* Sur-reply 18; Ex. 2013, 2.

The lack of a nexus undermines a showing of copying. Nor has Patent Owner explained how any copying of a two-carrier hanger shows copying of the *system* of claims 1 and 6 that comprises a messenger wire *and* a plurality of cable hangers. *Liqwd, Inc. v. L’Oreal USA, Inc.*, 941 F.3d 1133, 1138 (Fed. Cir. 2019) (“[T]he proponent of objective evidence offered to show nonobviousness, such as copying, must show that a nexus exists between the evidence and the claimed features of the invention.”); *Iron Grip Barbell Co., Inc. v USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2005) (“copying requires the replication of a specific product”).

c. Alleged Commercial Success

As discussed *supra* in Section II.D.15.a. CAB sells many components separately rather than as claimed *systems* of a messenger wire and hangers. For components sold as systems, sales include cable hangers and pier kits that were not shown to be coextensive with claims 1 and 6 by Dr. Kern. Reply 25. Other features that drive customer sales are not recited in claims 1 and 6, or they are features disclosed in the prior art as discussed below.

Dr. Putnam's analysis of sales growth of the claimed inventions is undermined because he considers sales of CAB's "Standard System," which he states is "coextensive with the inventions claimed in the '291 patent." Ex. 2044 ¶ 10. Solar Sales Figures for Jan 2014 – Mar 2024 include sales of (1) 18 End Pier Kits and (2) 86 Mid Pier Kits that are not claimed. *Id.* ¶ 13 n.8 (citing Ex. 2046), App. 2.1 (citing Solar Sales Figures (Ex. 2046)) to show CAB's sales growth), App. 2.2 (same). Nor has Patent Owner asserted that pier kits are covered by claims 1 and 6. PO Resp. 50, 54–60; Reply 25.

Dr. Putnam considers sales of (1) 43 different "2 Carrier Hangers," none of which is shown by Dr. Kern to be coextensive with the '291 patent claims, (2) 45 different "3 Carrier Hangers," only one of which is shown by Dr. Kern to be coextensive with the '291 patent claims, (3) 14 different "4 Carrier Hangers," none of which is shown by Dr. Kern to be coextensive with the '291 patent claims, and (4) four "5 Carrier Hangers," none of which is shown by Dr. Kern as coextensive with the '291 patent claims. Ex. 2044 ¶ 61 n.47 (citing sales of many different component part numbers in many different combinations to different customers in Ex. 2056), Apps. 2.1 and 2.2 (citing sales of many different pier kits, messenger wires, and hangers with different part numbers in Ex. 2046); Ex. 2038, App. A; Reply 25.

The inclusion of sales of pier kits inflates CAB's sales growth under Dr. Putnam's analysis. *See* Ex. 2044, App. 2.2.; Reply 25–26; Ex. 1035, 6–9, 15–16, 18; Reply 25–26. Pier kits are covered by other CAB patents. *See* Ex. 1035, 6–10; Reply 18.

Dr. Putnam testifies that certain Requests for Proposals (RFPs) show that “customers specifically requested the patented features.” Ex. 2044 ¶ 37. He states, “[o]ne can readily see that (a) customers demanded components having the claimed features; [and] (b) customers did not demand extraneous components or unclaimed features.” *Id.* ¶ 38. His analysis of “Customer demand for CAB's patented features” appears in Appendix 3 of Ex. 2044.

Appendix 3 indicates customers requested end pier and mid pier kits that are not covered by the '291 patent claims. Customers requested two-, three-, and four-carrier hangers with different part numbers that were not analyzed by Dr. Kerns for co-extensiveness with claims 1 and 6. Ex. 2038, App. A. Only two RFPs requested hangers with part numbers that Dr. Kern lists in his nexus analysis. *Id.* at A6; Ex. 2044, App. 3. As discussed *supra* in Section II.D.15.a., it is not clear if these part numbers correspond to the hangers that Dr. Kern compared to claims 1 and 6 of the '291 patent.

Dr. Putnam's reliance on CAB Solar Sales Figures for 2018 includes sales of pier kits that are not covered by the '291 patent and sales of many cable hangers and messenger wires with different part numbers (Ex. 2046) than Dr. Kern analyzed (Ex. 2038, App. A) or no part numbers (Ex. 2056) to link them to Dr. Kern's analysis. Ex. 2044 ¶ 61 & n.47 (citing Ex. 2056). The annual sales include sales of an Integrated System with an integrated grounding feature that drives customer demand, but the system is covered by the '551 patent, not the '291 patent. Ex. 2044 ¶ 61; Reply 18, 25–26.

Dr. Putnam indicates the Integrated System increased sales over the Standard System. Ex. 2044 ¶ 10. Although the integrated grounding feature is not covered in the '291 patent, Dr. Putnam includes sales of the Integrated System in his analysis and opinion regarding the '291 patent. *Id.*; Reply 27.

Dr. Putnam testifies that features of the Standard System provide cost savings, quicker installation, flexibility, simplified repairs and maintenance, and reduced environmental impact over trenches and trays. Ex. 2044 ¶¶ 28–31. The features that “form an essential part of CAB’s pitch to prospective customers” (PO Resp. 56; Ex. 2044 ¶ 31) are hangers that support cables on aerial messenger wires (Ex. 2044 ¶¶ 28–31). Almy and Carr support cables on hangers attached to aerial messenger wires, as discussed in Ground 3, as does prior art (Exs. 1012–1014) discussed in Pet. 6–8. As explained above, Carr’s messenger wire and hanger system is coextensive with claims 1 and 6 of the '291 patent except for being used with solar panels, as Almy teaches. Also, the '291 patent describes prior art systems that use hangers to suspend electrical cables from messenger wires. Ex. 1001, 1:18–2:20.

“If commercial success is due to an element in the prior art, no nexus exists.” *Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1369 (Fed. Cir. 2011); *see also Asyst Techs., Inc. v Emtrak, Inc.*, 544 F.3d 1310, 1316 (Fed. Cir. 2008) (“Asyst’s failure to link that commercial success to the features of its invention that were not disclosed in Hesser undermines the probative force of the evidence pertaining to the success of Asyst’s and Jenoptik’s products.”); *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997) (“[T]he asserted commercial success of the product must be due to the merits of the claimed invention beyond what was readily available in the prior art.”).

CAB's 2010 catalog, which antedates the November 29, 2014, filing date of the '291 patent, sells messenger wire systems that support electrical cables from hangers and rings. Ex. 1029, 1, 5, 14. CAB's PVC coated rings and saddles are industry favorites for safe, strong support of aerial cables. *Id.* at 14. "CAB Rings are recommended for aerial cables in plants, mills, tunnels, open pit mines, and pipeline projects." *Id.*

A SolarPro article states that for more than 40 years, CAB has made and sold cable rings and saddles for aerial cable support under the CAB brand, and utility-scale solar is an emerging market for aerial cable support systems. Ex. 2018. The '291 patent claims new uses for CAB's products.

As a result, the commercial success that Dr. Putnam attributes to the Standard System results from using an aerial messenger wire and hangers to suspend cables as the prior art discloses rather than from an inventive design of the messenger wire or hangers. Ex. 2044 ¶¶ 28–34, 53; *see Apple Inc. v. Samsung Elecs. Co., Ltd.*, 816 F.3d 788, 810 Fed. Cir. 2016) (explaining that even if Apple phones with autocorrection sell better than phones without autocorrection, Apple did not show that phones with an autocorrection that is embodied by claim 18 sell better than phones with other autocorrection taught by the prior art), *aff'd*, 839 F.3d 1034, 1072 (affirming an en banc judgment of invalidity of the '172 patent); *In re Cree, Inc.*, 818 F.3d 694, 704 (Fed. Cir. 2016) ("As the Board found, 'the record is completely silent on whether the commercial success was caused by the subject matter of the '175 patent as distinct from the prior art.'"); *Ormco Corp. v Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006) ("[I]f the feature that creates the commercial success was known in the prior art, the success is not pertinent.").

Dr. Putnam’s analysis overlooks other features that drive customer demand. In a SolarPro interview, Mr. Wedding, a CAB Solar specialist, discusses features that *define* CAB’s cabling system. He states that CAB’s cabling system “consists of a high-strength messenger wire that is securely attached to mid and end piers within the solar array [and] PVC-coated steel hangers attach to the messenger wire.” Ex. 2018, 1. He states that “[o]ur 80-mil PVC coating is flame retardant, has a high dielectric grade and is UV stabilized for a long service life.” *Id.* Neither Patent Owner nor Dr. Kern asserts that claims 1 and 6 cover PVC coatings, much less flame retardant, high dielectric grade, or UV stable coatings, messenger wires or hangers of certain strength, or pier mounts that suspend messenger wires.⁸ See PO Resp.; Ex. 2038. Yet, CAB promotes these features. See Ex. 2044 ¶ 24 (a supplier’s advertising or promotion of a feature or customer request for a feature indicates the feature drives customer demand for a product).

CAB’s bids specify its cable carriers have (1) “Safety orange PVC Plastisol coating,” (2) a 1/4” or 3/8” lock, and use (3) end pier and mid pier attachment kits and (4) a 1/4” EHS Class A messenger wire. Ex. 2051, 3; Ex. 2042, 2; see Ex. 2050, 4. Neither Patent Owner nor Dr. Kern asserts that any of these features is coextensive with claims 1 and 6 of the ’291 patent, even though CAB lists these features as part of its cable management system of hangers and messenger wires in its bids to customers.

⁸ Claim 7 recites hanger features that engage the messenger wire. Claim 8 recites cable hanger materials. Claims 11–13 recite cable hanger coatings. Ex. 1001, 11:6–28. Claims 1 and 6 are broader. *Phillips*, 415 F.3d at 1315. These features also encompass CAB’s own prior art products. See Ex. 1029, 3, (flame retardant plastisol coating), 14 (galvanized or stainless steel rings and 80 mil high dielectric grade, UV stabilized PVC plastisol coating).

Customers express concerns about these and other unclaimed features such as the design life of the system, cable damage due to cable movement in the hanger from wind, PVC coatings having a 25-year design life, hanger spacing, and system sagging. Ex. 2006 ¶ 61. Cable hanger PVC coatings, cable hanger materials, and hanger spacing address such concerns (Ex. 1001, 3:53–57, 4:3–34, 4:43–45, 6:37–43), but they are not recited in claims 1 and 6 or asserted to be part of a Standard System that Dr. Kerns analyzed for a nexus. *See* PO Resp.; Ex. 2038 ¶¶ 180–197, App. A. PVC coatings also prevent contact of exposed rings/saddles and conductors. Ex. 1006, 14–15.

An article about “The Array Changers 50 key components making PV shine” in PV Magazine, a lead solar publication (Ex. 2006 ¶ 54) describes CAB’s “highly-rated cable rings and saddles” as “[t]he 80-mil PVC coated products are manufactured from Class 3 galvanized high-tensile spring steel that supports a safe working load of over 290 kg [and] [t]he PVC coating has a dielectric breakdown strength of 400 volts per mil, is flame retardant, UV stabilized and abrasion resistant.” Ex. 2016, 6. The PVC coating and spring steel material drive customer satisfaction, but these features are not recited in claims 1 and 6 of the ’291 patent. *See* Reply 28.

These PVC coatings and hanger materials are prior art features known in the art, as illustrated by CAB’s own 2010 catalog. Ex. 1029, 5, 14.

Dr. Putnam also gives short shrift to the effects of the 2014 NEC changes that required solar plant operators to separate AC and DC electrical cables and reduced the use of trenches and trays. This regulatory mandate also drove customer demand for CAB’s Standard System as illustrated by a Brooks Engineering report. *See* Ex. 1032, 12–13; Ex. 1001, 1:32–42, 2:3–6.

Dr. Putnam’s economic fundamentals of reduced installation time and maintenance costs and superior lifecycle (Ex. 2044 ¶¶ 52, 53) result from using prior art messenger wires and cable hangers and unclaimed hanger materials, locking arms, PVC coatings, and pier mounts. *See ABT Systems, LLC v. Emerson Elec. Co.*, 797 F.3d 1350, 1361 (Fed. Cir. 2015) (finding no evidence that the success of the product was driven by a novel aspect of the claimed invention); *J.T. Eaton*, 106 F.3d at 1571 (“the asserted commercial success of the product must be due to the merits of the claimed invention beyond what was readily available in the prior art”); *Ormco*, 812 F.3d at 1034 (“[I]f the commercial success is due to an unclaimed feature of the device . . . the success is not pertinent.”); Ex. 1001, 3:4–15, 4:3–33.

Dr. Putnam’s failure to compare CAB’s sales to the relevant market and to competing systems weakens the evidence of commercial success. *See In re Applied Materials, Inc.*, 692 F.3d 1289, 1300 (Fed. Cir. 2012); *In re Huang*, 100 F.3d 135, 139–40 (Fed. Cir. 1996) (absent evidence that sales are a substantial quantity in the relevant market, bare sales numbers are a weak showing of commercial success); *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991) (relying solely on numbers of units sold is insufficient to establish commercial success); Reply 24.

In sum, we find weak evidence of commercial success due to (1) no showing of nexus to the many components CAB sells, (2) prior art aerial messenger wires and cable hanger features driving sales over trenches and trays, (3) counting sales of individual components and pier kits rather than *systems* of messenger wires and cable hangers, and (4) counting sales that result from unclaimed features of messenger wire and cable hanger materials, PVC coatings, pier kits, and integrated conductors.

d. Alleged Industry Praise and Awards

Patent Owner asserts that it received the following industry praise for its above-ground cable management system: (1) a 2014 Finalist for the Intersolar Award in photovoltaics (Ex. 2009); (2) PV Magazine’s top 50 “Array-changing Technologies” (Ex. 2016); and (3) SolarPro Magazine’s featured article for “Aerial Cable Support Systems (Ex. 2018). PO Resp. 60 (citing Declaration of Allen Garrett Smith at Ex. 2006 ¶¶ 40, 55, 60). Patent Owner argues that the praise and awards signify that the industry recognized the innovative nature and import of CAB’s systems and their positive impact on the design and installation of utility-scale PV solar plants. *Id.* at 60–61.

The asserted industry praise and awards are not linked to the claimed invention, or they result from prior art features of the Standard System such as messenger wires, cable hangers, and PVC coatings. The 2014 Intersolar Award does not describe the CAB system that merited the award. Ex. 2009. The SolarPro magazine article describes CAB’s aerial cable support systems of cable rings and saddles that have been made and sold for more than 40 years and now are used in the solar market. Ex. 2018. Mr. Wedding, a CAB Solar specialist, touts the following unclaimed features of the aerial cable support system as (1) a high-strength messenger wire securely attached to mid and end piers in a solar array, (2) PVC-coated steel hangers that attach to the messenger wire and securely lock in place, and (3) an 80-mil PVC coating that is flame retardant, has a high-dielectric grade, and is UV stabilized for a long service life. *Id.* The PVC coating is disclosed in CAB’s 2010 catalog. Ex. 1029, 14. CAB’s use of its aerial cable management system in the emerging solar industry required the use of pier mount kits, which are not claimed in the ’291 patent. *See* Ex. 2018.

CAB's aerial messenger wire and cable hangers provide cost savings because they replace trenches and cable trays not because they use inventive technology. Ex. 2018. Claims 1 and 6 do not recite locking arms or features that lock cable hangers onto a messenger wire although Mr. Wedding touts this feature. *Id.* CAB's prior art cable rings used high tensile spring steel and locks to secure the rings tightly to a messenger wire. Ex. 1029, 14. CAB's prior art long and short rings separated cables along a messenger wire. *Id.* The messenger wire is not claimed as a high-strength wire in the '291 patent even though this feature is touted by Mr. Wedding. Ex. 2018.

CAB's aerial cabling system provides labor and cost savings by avoiding problems associated with digging trenches in rocky, wet, or less desirable ground conditions, but CAB sold aerial cable hanger systems with messenger wires years before finding a new use for this system in the solar industry. *See* Ex. 1001, 1:18–42, Ex. 1029, 14 (2010 CAB catalog of cable rings and saddles used as an “Industry Favorite for Safe, Strong Support of Aerial Cables” in plants, mills, tunnels, open pit mines, and pipeline projects including award winning PVC coated rings and saddles that have a high dielectric grade, UV stabilized PVC plastisol coating, and the rings can run cables separately using long and short style rings). Almy, Carr, and prior art (Exs. 1012–1014) discussed in Pet. 3–8 and 10–15 disclose similar systems.

The PV Magazine award recognizes CAB's cable rings and saddles as a low cost alternative to cable trays to cut installation costs and maintenance problems by using 80-mil PVC coated hangers made of galvanized high-tensile spring steel that can support a load over 290 kg. Ex. 2016, 6. The PVC coating with a high dielectric strength, flame retardance, UV stability, and abrasion resistance (*id.*) is a prior art CAB technology (Ex. 1029, 14).

Praise for CAB's cable support system results from using its prior art technology with multi-carrier hangers like Carr to replace its long and short style rings. *See* Ex. 1029, 14. The claimed system uses a messenger wire and cable hangers. Ex. 1001, 10:24–67. Pre-drilled holes in SunEdison's piles/trackers and Array Technologies' piers for fast, easy installation of CAB L brackets (pier mounting kits) recognize other unclaimed features of the Standard System, namely, end and mid pier kits that drive sales of the Standard System. PO Resp. 61 (citing Ex. 2006 ¶¶ 62–64); Ex. 2028 ¶ 41.

Mr. Bowman's testimony that FTC Solar designed a Voyager tracking system "to be compatible with CAB's above-ground cable management system" does not explain what features of CAB's system were used with the Voyager or how those features relate to claims 1 and 6 of the '291 patent. Ex. 2028 ¶ 49. Nor does Mr. Bowman indicate what features of CAB's system became the industry standard. *Id.* ¶¶ 48, 49 (cited in PO Resp. 61). His testimony provides no nexus to the claimed invention. It appears that the features that drive industry praise include unclaimed piers, cable hanger materials, and PVC coatings.

Mr. Novak's recommendation of CAB's aerial cable management system as an improvement over trenches and trays does not identify features of the claimed system that drove his recommendation. Ex. 2059 ¶ 55 (cited in PO Resp. 61). No clear nexus is established. *See* Reply 29.

In sum, we find weak evidence of industry praise due to the lack of a nexus shown between the praise and claimed invention and the fact that at least some of the praise is based on unclaimed or prior art features like high strength messenger wire, pier kits, PVC coatings, and hanger materials.

e. Alleged Long Felt but Unsolved Need in Solar Industry

Even accepting that the PV industry faced numerous challenges in implementing a “safe, reliable, and Code-compliant wire management system for exposed PV conductors” (PO Resp. 62 (quoting Ex. 1011, 2), it is not clear that CAB’s cable management system solved that need with inventive, rather than unclaimed or prior art, features.

The PV Array Wire Management article in SolarPro magazine cited by Patent Owner to support its contentions states that managing “exposed PV conductors is not an easy task” and that UV-rated plastic wire ties can bundle and fasten conductors but require regular inspection and replacement. Ex. 1011, 2 (explaining that stainless steel cable clips that attach conductors to a module frame only support one to two conductors at a time).

As discussed *supra* in Sections II.D.15.c.–d., features of the Standard System of claims 1 and 6 that meet the alleged long-felt need are prior art features such as CAB’s high strength messenger wires and tensile steel cable hangers and unclaimed features such as high strength messenger wire, high tensile strength hanger wire, PVC coatings, and pier kits. Thus, we do not find a nexus between the claimed invention and meeting the industry needs.

The SolarPro article explains that wire management is the Achilles heel of PV installations due to “the harsh environmental conditions that PV array conductors are exposed to—UV radiation, high winds and extreme ambient temperatures, and ice, snow and other debris.” Ex. 1011, 2. The Standard System addresses such issues via the gauge and configuration of the messenger wire and cable hangers and UV-resistant, dielectric, 80-mil PVC coatings, which are prior art including CAB’s own products (Ex. 1029, 14) and which are not claimed, as discussed *supra* in Section II.D.15.c.–d.

The article identifies problems with poor wire management according to Mr. Bill Brooks, President of Brooks Engineering. Problems include (1) putting string conductors in contact with sharp edges to create ground faults that short-circuit the array, (2) incorrectly polarizing combiner boxes creating short circuits and fires, (3) improperly installing thermal expansion fittings, (4) not addressing thermal expansion of conductors inside raceways causing damage at box fittings, (5) putting too much stress on conductor installation with steel wire ties, (6) not seating plug connectors fully, (7) stressing the junction box and plug connectors to cause them to fail, separate, and arc, and (8) using improper torque procedures on combiner box terminals. Ex. 1011, 2–3; *see* PO Resp. 62–63. Patent Owner has not explained how the Standard System, or messenger wire and hangers, solves any of these problems. Short circuits may be addressed by PVC coatings or the Integrated System, but neither feature is recited in claims 1 or 6.

Mr. Novak testifies to challenges facing PV arrays from extreme hot and cold temperatures, extreme wind gusts, snow, sleet, hail, sand, rodents chewing through cables, or birds nesting in the system. Ex. 2059 ¶¶ 46, 47 (cited in PO Resp. 62). Patent Owner does not explain how its Standard System, messenger wire, and cable hangers recited in claims 1 and 6 solve any of these problems. PO Resp. 62–63. The unclaimed mid and end pier mounting kits may stabilize a messenger wire and cable bundles against wind gusts and support it against snow or sleet if the messenger wire and cable hangers are the proper strength, configuration, and spacing, but these features are not recited in claims 1 and 6. Some are in the prior art or CAB's 2010 catalog. Ex. 1029, 14; Pet. 3–8, 10–15; Ex. 1004; Ex. 1005. We find a weak showing that the claimed invention met a long-felt but unmet need.

f. Alleged Industry Skepticism

Patent Owner asserts that its cable management system faced industry skepticism from experts used to trenching and cable trays. PO Resp. 64. Some were skeptical that “CAB’s system could address the environmental issues identified in the SolarPro article and comply with the NEC.” *Id.* (citing Ex. 2059 ¶¶ 46–48). Others were “concern[ed] about ultraviolet ray and radiation resistance, how to structure the hanger support system, wind causing the hangers to sway and fray the jacket of power cables, compliance with various code requirements . . . and the long-term reliability of the system.” *Id.* at 65 (quoting Ex. 2028 ¶ 34).

Some concerns relate to managing cables in a solar plant and its harsh environments, rather than to CAB’s cable management system. Ex. 2059 ¶¶ 43–48; Ex. 2060, 33–37 (problems with plastic wire ties and cable clips); Reply 32. Concerns with CAB’s system were addressed by unclaimed pier mount kits that stabilize messenger wires and hangers against environmental forces, messenger wire and cable hanger materials, and PVC coatings as discussed *supra* in Sections II.D.15.c.–e. Some of these features are prior art in CAB’s 2010 system, Carr, and Almy. Ex. 1029, 14. Messenger wires and hangers reduce costs to install and maintain the system. Ex. 2028 ¶ 36.

Most of the skepticism reflects the solar industry’s practice of testing any new technology thoroughly. Dr. Kern testifies “it is the norm for new solar technologies to be faced with significant industry skepticism, and such new technologies can only be successfully adopted after significant analysis, testing, and confirmation.” Ex. 2038 ¶ 219. CAB’s system was tested at an outdoor solar testing facility used for that purpose. Ex. 2028 ¶ 35.

In sum, we find weak evidence of overcoming industry skepticism.

g. Conclusion

As discussed above, we find weak evidence of copying, commercial success, industry praise, solving a long-felt need, and overcoming industry skepticism due to the lack of a nexus to the inventive features of claims 1 and 6 rather than to unclaimed and prior art features. The evidence indicates that any commercial success, industry praise, solving a long-felt need, and overcoming industry skepticism result from using prior art aerial messenger wires and cable hangers or unclaimed features such as PVC coatings, pier kits, and specific messenger wire and cable hanger materials.

16. Conclusion

Weighing all of the evidence of obviousness and nonobviousness, to include evidence of secondary considerations presented by Patent Owner, we determine that the strong evidence of obviousness outweighs the weak evidence against obviousness. We determine that Petitioner has established by a preponderance of evidence that claims 1–10, 14–22, 24, and 25 are unpatentable over the combination of Carr and Almy. *See Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) (holding “secondary considerations of nonobviousness . . . simply cannot overcome a strong prima facie case of obviousness. . . . [W]here the inventions represented no more than ‘the predictable use of prior art elements according to their established functions,’ *KSR*, 550 U.S. at 417 . . . , the secondary considerations are inadequate to establish nonobviousness as a matter of law.”); *Ohio Willow Wood Co. v. Alps South, LLC*, 735 F.3d 1333, 1344 (Fed. Cir. 2013) (evidence of secondary indicia is often inadequate to establish nonobviousness of claims involving the predictable use of prior art elements).

E. Ground 1: Asserted Obviousness Over Caveney
Ground 2: Asserted Obviousness Over Caveney and Almy

In Ground 1, Petitioner asserts that claims 1–5, 9, and 10 are unpatentable under 35 U.S.C. § 103 over Caveney. Pet. 21–36. In Ground 2, Petitioner asserts that claims 14–18, 21, and 22 are unpatentable under 35 U.S.C. § 103 over Caveney and Almy. *Id.* at Pet. 36–42.

Because we have found all challenged claims to be unpatentable (*see* discussion *supra* in Section II.D), we need not (and do not) address whether Petitioner has shown the claims to be unpatentable based on these alternative grounds. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing the “Board need not address issues that are not necessary to the resolution of the proceeding” and agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

F. PETITIONER’S MOTION TO STRIKE

In view of our determination that Petitioner has established that all of the challenged claims are unpatentable over the combination of Carr and Almy, we dismiss Petitioner’s Motion to Strike citations to Ex. 2038 and Ex. 2044 in Section VIII.D.1. of Patent Owner’s Response and the cited portions of Ex. 2038 and Ex. 2044 as mooted by our decision. Even considering this evidence, we still determine the challenged claims to be unpatentable over Almy and Carr, as discussed *supra* in Section II.D.

III. CONCLUSION⁹

Based on the evidence presented with the Petition, the evidence introduced during the trial, and the parties' respective arguments, Petitioner has shown by a preponderance of the evidence that claims 1–10, 14–22, 24, and 25 are unpatentable.

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–5, 9, 10	103	Caveney ¹⁰		1–5, 9, 10
14–18, 21, 22	103	Caveney, Almy ¹¹		14–18, 21, 22
1–10, 14–22, 24, 25	103	Carr, Almy	1–10, 14–22, 24, 25	
Overall Outcome			1–10, 14–22, 24, 25	

⁹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or a reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

¹⁰ We do not address Petitioner's contentions that claims 1–5, 9, and 10 would have been obvious over Caveney. *See supra* Section II.E.

¹¹ We do not address Petitioner's contentions that claims 14–18, 21, and 22 would have been obvious over Caveney and Almy. *See supra* Section II.E.

IV. ORDER

Accordingly, it is:

ORDERED that claims 1–10, 14–22, 24, and 25 of U.S. Patent No. 11,349,291 B2 are determined to be unpatentable; and

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

FURTHER ORDERED that Petitioner's Motion to Strike is dismissed.

IPR2024-00178
Patent 11,349,291 B2

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