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.

IPR2024-00182
Patent 11,349,291 B2

PETITION FOR *INTER PARTES* REVIEW

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35 U.S.C. §282(b) 18

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TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 11,349,291 to Smith et al.
1002	Declaration of Dr. Beik and CV.
1003	Reserved
1004	U.S. Patent Publication No. 2010/0139731 to Almy ("Almy").
1005	Reserved
1006	CAB Hooks, Hangers & Mine Safety Products Catalog, 2010 ("CAB Catalog").
1007	Underwriters Laboratories, "Safety Requirements for Wiring Systems and Connectors for Photovoltaic Systems," 1984.
1008	SnakeTray, "Solar Snake Tray Announces New Cable Tray That Attached to Messenger Wire Rope for Solar Installations," 2012, available at https://www.snaketray.com/solar-snake-tray-announces-new-cable-tray-that-attaches-to-messenger-wire-rope-for-solar-installations/.
1009	National Fire Protection Association, "The National Electrical Code," 2008 Edition.
1010	Department of the Army, the Navy, and the Air Force, "Technical Manual, Facilities Engineering, Electrical Exterior Facilities," 1996.
1011	SolarPro Magazine, "PV Array Wire Management," 2013.
1012	U.S. Patent No. 1,841,479 to Jessen.
1013	U.S. Patent No. 2,820,083 to Hendrix.
1014	Windpower Engineering, "Cable Spacers Solve Problem of Many Cables and Not Much Pole Space," 2012, available at https://www.windpowerengineering.com/cable-spacers-solve-problem-of-many-cables-and-not-much-pole-space/.
1015	File History of U.S. Patent No. 11,349,291.
1016	Reserved
1017	Reserved
1018	Jung, et al., "An In-depth Analysis for Optimal Cable Tray Support Span," Sustainable Marine Structures, Volume 02, Issue 01, January 2020.
1019	IEEE Green Book 142, IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems, 2007.
1020	IEEE, National Electrical Safety Code Committee, Accredited Standards Committee C2, Interpretation, Rule 235G, 2002.

1021	Advanced Cable Ties, Inc., "Cable Tie 'Type' Classifications."
1022	IEEE Std 525-2007, "IEEE Guide for the Design and Installation of Cable Systems in Substations," 2007.
1023	IEEE Std 1185-2010, "IEEE Recommended Practice for Cable Installation in Generating Stations and Industrial Facilities," 2011.
1024	CAB Catalogs Web Page March 14, 2011, Internet Archive, https://web.archive.org/web/20110314084628/http://www.cabproducts.com/web_content.php?LookupID=catalogs.

CLAIM LEGEND

No.	Claim Language
1[a]	A system for organizing a plurality of electrical cables extending from a plurality of solar panels, the system comprising:
1[b]	a messenger wire structured to be supported a distance above the ground; and
1[c]	a plurality of cable hangers structured to be disposed along, and suspended from, the messenger wire, each cable hanger having a plurality of cable carrying surfaces, each cable carrying surface being structured to support at least one electrical cable of the plurality of electrical cables,
1[d]	wherein adjacent cable carrying surfaces of the plurality of cable carrying surfaces are separated by a cable carrier divider.
2	The system of claim 1, wherein the plurality of cable carrying surfaces comprises at least three cable carrying surfaces.
3	The system of claim 1, wherein the plurality of cable carrying surfaces comprises at least four cable carrying surfaces.
4	The system of claim 1, wherein the plurality of cable carrying surfaces comprises at least five cable carrying surfaces.
5	The system of claim 1, wherein the cable carrier divider extends vertically.
6[a]	A system for organizing a plurality of electrical cables extending from a plurality of solar panels, the system comprising:
6[b]	a messenger wire structured to be supported a distance above the ground; and
6[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, wherein each cable hanger of the plurality of cable hangers comprises:
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;
6[e]	outermost lateral spaced apart opposing sides forming the boundary of said hanger;

No.	Claim Language
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.
7	The system of claim 6, 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.
8	The system of claim 1, 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.
9	The system of claim 1, wherein each cable hanger of the plurality of cable hangers further comprises a formation structured to support a data carrier.
10	The system of claim 9, wherein the formation structured to support the data carrier is positioned closer to the messenger wire than the cable carrying surfaces.
11	The system of claim 1, wherein each cable hanger of the plurality of cable hangers includes a plastisol or PVC coating.
12	The system of claim 11, wherein the coating has a thickness in the range of from 50 mils to 100 mils thick.
13	The system of claim 1, wherein each cable hanger of the plurality of cable hangers includes a coating having a flame retardant, high dielectric grade, UV inhibited material.
14[a]	A solar plant comprising:
14[b]	a plurality of solar panels;
14[c]	a plurality of electrical cables extending from the plurality of solar panels; and
14[d]	a system for organizing the plurality of electrical cables, the system comprising:
14[e]	a messenger wire supported a distance above the ground adjacent the solar panels; and
14[f]	a plurality of cable hangers disposed along, and suspended from the messenger wire, each cable hanger having a plurality of cable carrying

No.	Claim Language
	surfaces, each cable carrying surface being structured to support at least one electrical cable of the plurality of electrical cables,
14[g]	wherein adjacent cable carrying surfaces of the plurality of cable carrying surfaces are separated by a cable carrier divider.
15	The solar plant of claim 14, wherein the plurality of cable carrying surfaces comprises at least three cable carrying surfaces.
16	The solar plant of claim 14, wherein the plurality of cable carrying surfaces comprises at least four cable carrying surfaces.
17	The solar plant of claim 14, wherein the plurality of cable carrying surfaces comprises at least five cable carrying surfaces.
18	The solar plant of claim 14, wherein the cable carrier divider extends vertically.
19[a]	A solar plant comprising:
19[b]	a plurality of solar panels;
19[c]	a plurality of electrical cables extending from the plurality of solar panels; and
19[d]	a system for organizing the plurality of electrical cables, the system comprising:
19[e]	a messenger wire supported a distance above the ground adjacent the solar panels; and
19[f]	a plurality of cable hangers 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,
19[g]	wherein each cable hanger of the plurality of cable hangers comprises: “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;
19[h]	outermost lateral spaced apart opposing sides forming the boundary of said hanger;
19[i]	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.

No.	Claim Language
20	The solar plant of claim 14, 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.
21	The solar plant of claim 14, 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.
22	The solar plant of claim 21, wherein, for each cable hanger, the formation structured to support the data carrier is positioned closer to the messenger wire than the cable carrying surfaces.
23	The solar plant of claim 14, wherein each cable hanger of the plurality of cable hangers includes a plastisol, PVC coating, and/or a coating having a flame retardant, high dielectric grade, UV inhibited material.
24[a]	A method for organizing a plurality of electrical cables extending from a plurality of solar panels in a solar plant, the method comprising:
24[b]	providing a messenger wire a distance above the ground;
24[c]	providing a plurality of cable hangers spaced along 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;
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
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:
24[f]	a high tensile strength wire with two opposing ends and configured intermediate of said ends to form a plurality of substantially U-shaped configurations having cable carrying surfaces located thereon;
24[g]	outermost lateral spaced apart opposing sides forming the boundary of said hanger;
24[h]	opposite shoulders extending toward each other from said spaced apart opposite sides, each of said shoulders having an arrangement structured to

No.	Claim Language
	engage the messenger wire so as to securely hold the hanger on the messenger wire; and
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.
25	The method of claim 24, 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.

I. INTRODUCTION

Petitioner Affordable Wire Management, LLC ("AWM" or "Petitioner") respectfully requests *inter partes* review of claims 1-23 of U.S. Patent No. 11,349,291 (the "'291 Patent") (EX1001), assigned to patent owner Cambria County Association for the Blind and Handicapped, Inc. ("CAB" or "Patent Owner").

The challenged claims of the '291 Patent recite nothing more than the design for and use of prior art cable management systems—simple cable hangers hung from simple messenger wires—in the solar industry. Patent Owner overcame prior art rejections by arguing that "no such system(s)/components related to solar applications existed in the art prior to Applicant's development thereof." EX1015, 199. But such systems and components related to solar applications ***did*** exist, as the *Almy* reference explicitly discloses. *See* EX1004.

Moreover, as disclosed in the *CAB Catalog* reference, and as the applicant acknowledged during prosecution, cable hangers and messenger wires have been widely used for decades to support various types of current carrying cables and data cables in many industries and applications. *See* EX1003; EX1005; EX1015, 201. Nothing in the patent suggests that the claimed invention solved problems specific to solar applications. To the contrary, the specification repeatedly explains that issues of cable organization, management, separation, and installation are issues common to solar, mining, and electrical industries in general. *See, e.g.*, EX1001,

1:17-31, 1:32-42, 1:57-62, 4:37-5:11. Consistent with this understanding, as early as 1984—nearly three decades before the priority date—a report jointly issued by the Department of Energy, NASA's Jet Propulsion Laboratory, and Underwriters' Laboratories recognized the wide use of messenger supported wiring in a variety of industries and explained that "a messenger with rings and saddles for conductor support" is a "practical PV [photovoltaic] application … for terrestrial arrays located away from the building." EX1007, 39. Thus, even aside from the explicit disclosure in *Almy*, a POSITA would have had a clear motivation, with a reasonable expectation of success, to use the systems disclosed in *CAB Catalog* in solar applications.

Accordingly, claims 1-23 are unpatentable under 35 U.S.C. §103.

II. GROUNDS FOR STANDING

Petitioner certifies that the '291 Patent is available for *inter partes* review and Petitioner is not barred or estopped from requesting IPR on the grounds identified herein.

III. BACKGROUND OF THE '291 PATENT

A. Technology Overview

1. Cable Hangers and Messenger Wires

At its core, the alleged '291 Patent invention relates to cable management systems comprising cable hangers hung from messenger wires. *See* EX1001, Abstract ("A cable hanger for the solar, mining, and electrical industry for use in

supporting a plurality of conductive cables from a messenger wire."), claim 1 (claiming a system for organizing a plurality of electrical cables comprising a messenger wire and a plurality of cable hangers).

For decades, cable hangers and messenger wires have been used to support various types of current carrying cables and data cables in many industries and applications, including photovoltaic ("PV") systems. EX1002 ¶31; EX1001, 1:17-42. A report jointly issued in 1984 by the Department of Energy, NASA's Jet Propulsion Laboratory, and Underwriters' Laboratories explained that "a messenger with rings and saddles for conductor support" is a "practical PV application … for terrestrial arrays located away from the building." EX1007, 39. Similarly, in 2012, SnakeTray released a "cable tray system" that comprised a plurality of spaced-apart hangers for suspension from a messenger wire in solar installations. EX1008.

More generally, aerial cable support systems in both utility and solar electrical distribution systems typically comprise (1) utility poles, (2) a tension member running between the poles (e.g., a messenger wire, a catenary cable, a cable tray, or a beam), and (3) cable hangers (e.g., rings or saddles) spaced at regular intervals for supporting current-carrying wires. EX1002 ¶28. To avoid subjecting the current carrying cables to the tensile force of gravity, aerial cable support systems require cable hangers to support the current carrying cables. *Id.* Absent this support, the conductive cable insulation slowly degrades due to the tensile and compressional

forces applied to the conductive cable by gravity, increasing the likelihood of a catastrophic system failure. EX1002 ¶29.

Further, early standardized safety codes provide for suspending current-carrying wires using cable hangers hung from a messenger wire and, importantly, do not distinguish whether the installation is at a solar plant or any other energy application. For example, the National Electrical Code ("NEC") applies to electrical systems for residences, commercial and industrial facilities. *See* EX1009. Long before the time of the invention, the Article 369.2 of the 2008 NEC provided for messenger-supported wiring that used rings, saddles, or field-installed lashing material for conductor support. *Id.*, 241 ("An exposed wiring support system using a messenger wire to support insulated conductors by any one of the following: (1) ***A messenger with rings and saddles for conductor support*** [or] (2) ***A messenger with a field-installed lashing material for conductor support***.").[1] Article 690 of the 2008 NEC also provided requirements for solar photovoltaic system wiring. *Id.*, 579. However, the idea goes back much further. As early as 1996, the U.S. Army technical manual broadly explained that "all overhead cables consist of a messenger, which provides support, and one or more conductors attached to it by ***rings, wrappings, lashings, or insulated spaces***." EX1010, 49. And, as explained above, a

[1] Unless specifically noted, all emphasis is added.

Department of Energy, the Jet Propulsion Laboratory (which is owned by NASA), and Underwriters' Laboratories report disclosed the same idea as early as 1984. EX1007, 39.

2. Separation of AC, DC, and Data Carrying Wires

Several embodiments and claim limitations specify that the allegedly inventive cable hangers have structures that organize cables onto different cable carrying surfaces. The very nature of the electrical cables used in the solar industry compelled these configurations—the same as most other long-established industries utilizing electrical cabling.

Prior to 2014, it was well-known in all power distribution fields, including solar, that bundling AC, DC, and data carrying cables together could cause problems. EX1002 ¶32. For example, the current-carrying wires could induce a current in neighboring cables and create problematic crosstalk. *Id.* While cables could be adjacent to and contacting one another in a cable support systems (e.g., EX1001, 1:32-41, 2:3-6), it was best practice to avoid doing so. EX1002 ¶32. According to the '291 Patent, the 2014 NEC—which went into effect January 1, 2014—required AC and DC cables to be separated in any hanging or support system. EX1001, 1:32-41, 2:3-6. This requirement applied to all implicated fields, including solar, mining, and other electrical industries. EX1002 ¶32.

Additionally, although bundling cables with zip-ties, cable-ties, or other lashings was initially convenient, these solutions proved problematic. For example, a 2013 article in SolarPro explains that wire ties "are not a permanent answer and require regular inspection and replacement" and therefore "should be avoided." EX1011, 9. Therefore, prior to the invention, there was a need for a more permanent and robust hanger solution in the solar industry. EX1002 ¶33.

Further, because the benefits of separating wires in electrical systems were known even before the NEC required it, a variety of cable hanger designs for that purpose existed long before the time of the invention. For example, in 1932, U.S. Patent No. 1,841,479 issued to inventor George J. Jessen, disclosed a cable hanger containing two separated throughways to separately suspend two cables or conductors from a single messenger wire. EX1012, Fig. 3.

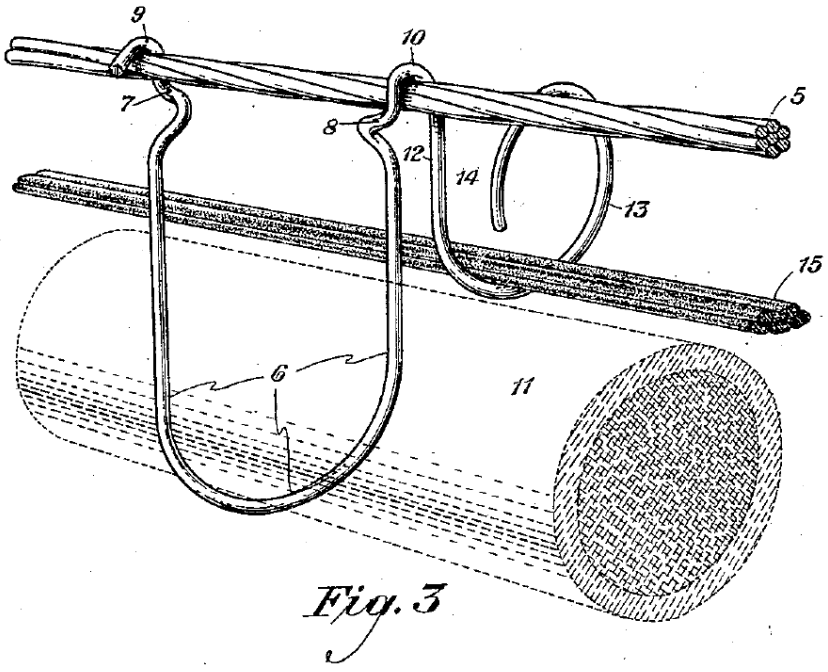
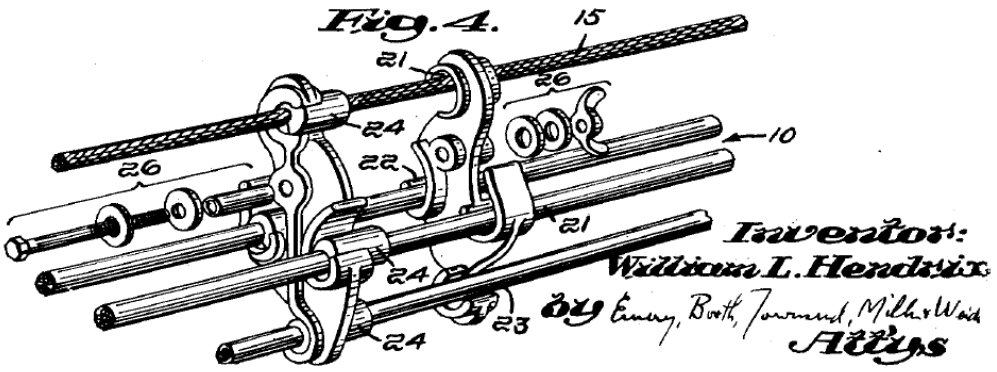


Fig. 3

Id. Similarly, in 1958, U.S. Patent No. 2,820,083 issued to inventor William L. Hendix—who founded Hendix Wire & Cable Inc., which is now one of the largest electrical system suppliers in the United States—disclosed a "hanger-spacer clamp" designed to support conducts from a messenger wire and without the use of shielding by spacing apart the conductors on the hanger. EX1013, 1:25-28, 1:70-2:9.



Id., Fig. 4. A cable hanger made by Hendix, substantively similar to the one described in its original 1950's patent, was still being used in all electrical applications including solar at the time of the invention. EX1014, 1 (describing the Hendrix Spacer-Cable system being used with power from "nuclear, coal, hydro, solar, and wind power").

Thus, the use of cable hangers in all aspects of the electrical power industries has been widespread over the last century. It is therefore unsurprising that, as early as in 2010, Patent Owner too was supplying cable hangers designed to support multiple spaced-apart conductors from a messenger wire:

CAB Plastic Telewire Hooks

Made from .085 x 1" (2.2 x 25.4mm) extruded PVC channel. Designed to hang from messenger wire or beltline structure. 5/8" (16mm) wide carriers. 15/16" (24mm) top hole. 1/4" (6.4mm) nylon nuts and bolts.

CAB 903 *200/box, 8 lbs. (3.6kg)*
CAB 904 *with 90º offset, 200/box, 8 lbs. (3.6kg)*
CAB 905 *2 carrier, 50/box, 7 lbs. (3.2kg)*
CAB 906 *3 carrier, 50/box, 9 lbs. (4.1kg)*
CAB 909 *4 carrier, 50/box, 12 lbs. (5.5kg)*

EX1006, 8.

B. Prior Art

1. CAB Hooks, Hangers & Mine Safety Products Catalog

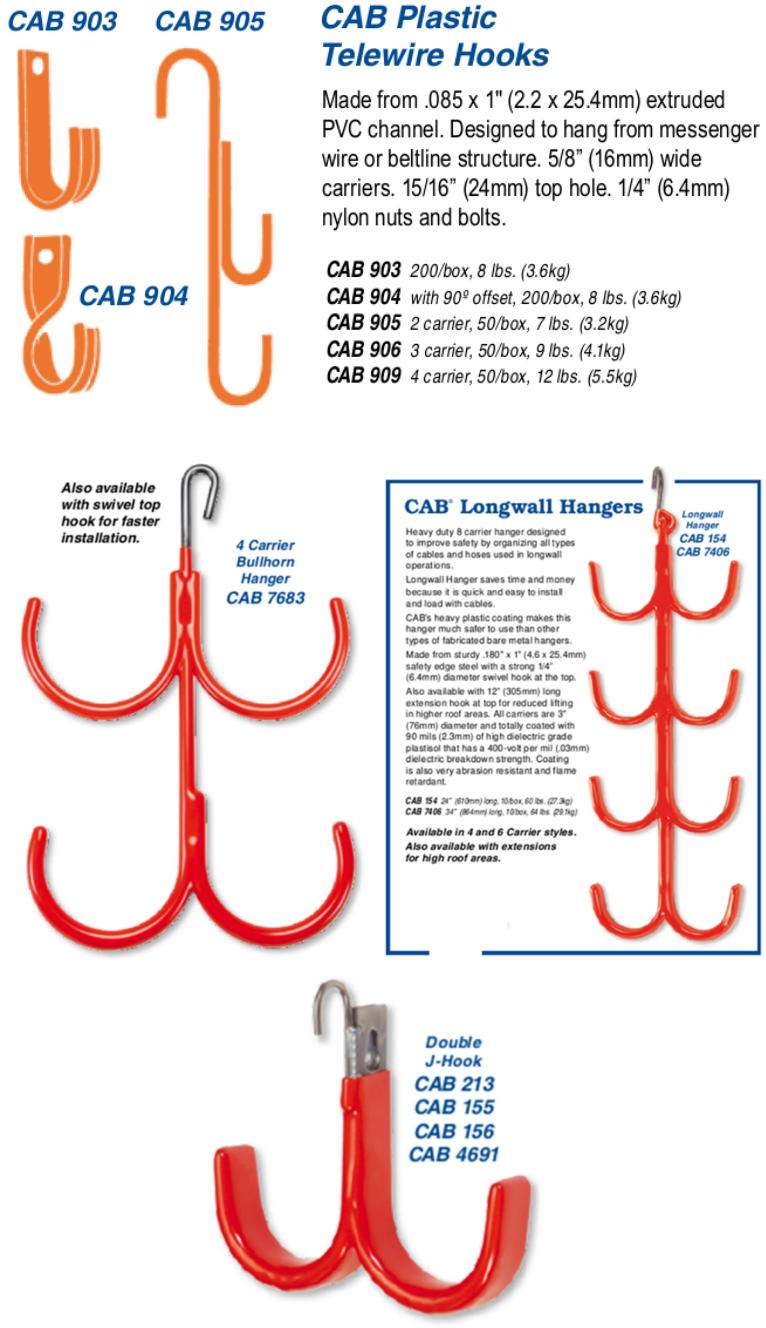
The "CAB Hooks, Hangers & Mine Safety Products" catalog ("*CAB Catalog*") bears a copyright date of 2010, is identified as "ver2010" and was publicly available on CAB's website at least as early as March 14, 2011. EX1006, 24. EX1024 (Internet Archive web page from March 14, 2011 showing availability of 2010 CAB Catalogs). Thus, CAB Catalog constitutes prior art under 35 U.S.C. §102(a)(1).

CAB Catalog shows and describes Patent Owner's product offerings—including cable hangers supported by messenger wires—from over a year before the priority date of the '291 Patent invention. According to *CAB Catalog*, Patent Owner's products are used to "safely suspend ***all types of electrical cables***." *Id.*, 3.

CAB Catalog discloses a wide variety of hangers for supporting "electrical cables" from messenger wire, plates, or other structures. *Id.*, 2, 8-9.

Id., 5, 14.

CAB Catalog also discloses cable hangers having a plurality (*i.e.*, more than one) of cable carrying surfaces:



Id., 8-11. Such "multi carrier hooks" are designed to organize "sensor, communication, control and electrical wiring [and is] useful … when running multiple cables." *Id.*, 7.

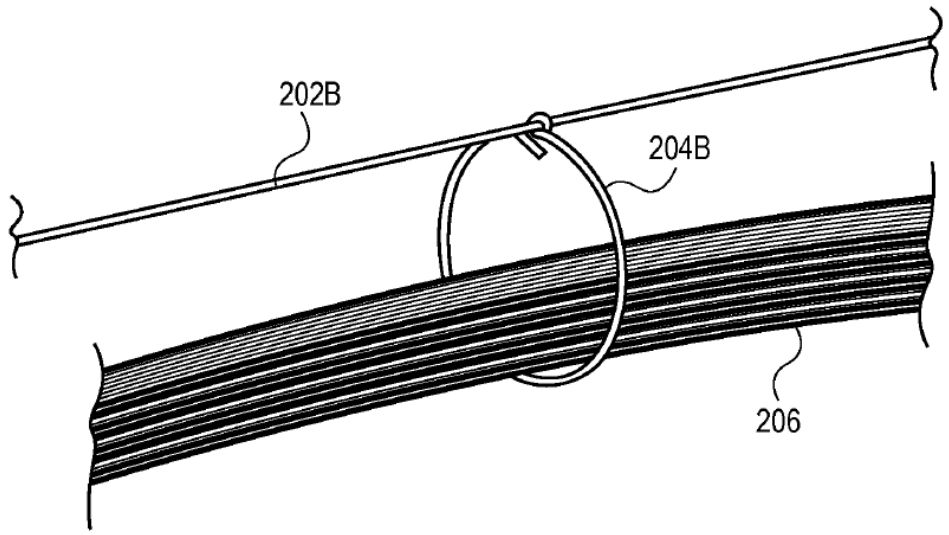
The field of endeavor for the ’291 Patent is wire management, organization, and support in solar, mining, and electrical applications. *See, e.g.*, EX1001, 1:18-62, 4:38-5:12. Because *CAB Catalog* discloses hangers for supporting electrical cables and wiring in the mining industry, it is analogous art to the ’291 Patent. *CAB Catalog* was neither cited nor considered during prosecution of the ’291 Patent. *See generally* EX1001.

2. Almy

“Wire-Based Hanging Wire-Way for Photovoltaic Modules or Module Groups” to Almy was published on June 10, 2010 as U.S. Patent Publication No. 2010/0139731. EX1004, Cover. *Almy*’s public accessibility is evidenced by its publication as a United States Patent Application Publication. *Id.* Thus, *Almy* constitutes prior art under both 35 U.S.C. §102(a)(1) and (2).

Like the ’291 Patent, *Almy* discloses a messenger wire and cable hanger system for use with solar panels in solar plants. For example, *Almy* teaches “a wire-based hanging wire-way” that supports bundles of electrical cables coupled to a plurality of photovoltaic module groups. *See, e.g.*, *Id*. ¶[0013]. The wire-based hanging wire-way “includes a wire-line with support loops.” *Id.* ¶[0018]. The support loops, or hangers, may be made from the same material as the wire-line, or may be separately fabricated from “galvanized steel, stainless steel, aluminum, nylon or clad copper.” *Id.* ¶¶[0019], [0021]-[0022]. Similar to the hangers in the ’291

Patent, each support loop is spaced apart from the next support loop and "is adapted to receive a bundle of electrical cable." *Id.* ¶22.



Id., Fig. 2B.

The field of endeavor for the '291 Patent is wire management, organization, and support in solar, mining, and electrical applications. *See, e.g.*, EX1001, 1:18-62, 4:38-5:12. Because *Almy* teaches a cable hanger system for use with a plurality of solar panels, it is analogous art to the '291 Patent. To the extent the Board finds that *Almy* is not from the same field of endeavor, alternatively, *Almy* is still reasonably pertinent to the particular problem with which the inventor was involved. As discussed, the '291 Patent discloses an improved cable hanger to address alleged problems including electrical cable management, separation and organization. *Almy* is reasonably pertinent to these problems as it discloses a "wire-based hanging wire-way for photovoltaic modules or module groups and methods for supporting a

bundle of electrical cables between photovoltaic modules or module groups." EX1004 ¶[0012]. Therefore, because it addresses problems in organizing and maintaining separation of electrical cables, *Almy* is analogous art. *Almy* was neither cited nor considered during prosecution of the '291 Patent. *See generally* EX1001.

IV. THE '291 Patent

A. Alleged Invention of the '291 Patent

The '291 Patent is directed to "a locking cable hanger and multiple cable carriers or saddles on one hanger" for use in the solar, mining, and electrical industries. EX1001, 1:18-19, 2:19-20. Consistent with the prior disclosures of *CAB Catalog* and *Almy*, the '291 Patent recognizes that many industries—including solar, mining, and electrical industries—have a common need for electrical cables to extend from a power or signal source to a location of application." *Id.*, 1:20-22. During prosecution, the inventor acknowledged that by 2010, Patent Owner itself had sold hundreds of different hangers for use in electrical applications across a wide variety of industries. *See* EX1015, 201 (noting that CAB manufactured over 500 different hangers dating back to the late 1970s, and its hangers were used for a variety of above ground and mining applications).

Regarding limitations directed to a plurality of cable carrying surfaces, the '291 Patent explains that in solar plants the DC wires, AC wires, and data cables are routed in parallel, often immediately adjacent to or even touching one another.

EX1001, 1:25-56. However, the ’291 Patent explains that on January 1, 2014—before the priority date of the ’291 Patent—a new version of the NEC went into effect that required all AC and DC wiring to be separated in a hanging cable system, including “cable trays, hangers, and all other types of cable support systems.” *Id.*, 2:3-6, 2:30-31. As acknowledged by the ’291 Patent, this change provided an express motivation to use hangers that provide the required spacing and support. *Id.*, 2:6-13, 2:28-32. In response to this stated requirement, the ’291 Patent discloses hangers as shown below in Figure 1 of the ’291 Patent. The “hanger 10 according to the present invention” includes “cable carrier formations 16, 17 with a cable divider 18 separating cable carrier formations 16 and 17.” *Id.*, 6:18-25. “What is important is that the hanger 10 provides a sufficient separation between both cable carrier formations 16, 17 and a further sufficient separation between the two carriers formations 16, 17, and the data carrier loop 28.” *Id.*, 7:14-17. As to multiple cable carriers or saddles, the ’291 Patent explains that the “locking hanger and saddle system can have one to five individual separate saddles or cable supports arranged in either a vertical or horizontal configuration.” *Id.*, 2:43-45.

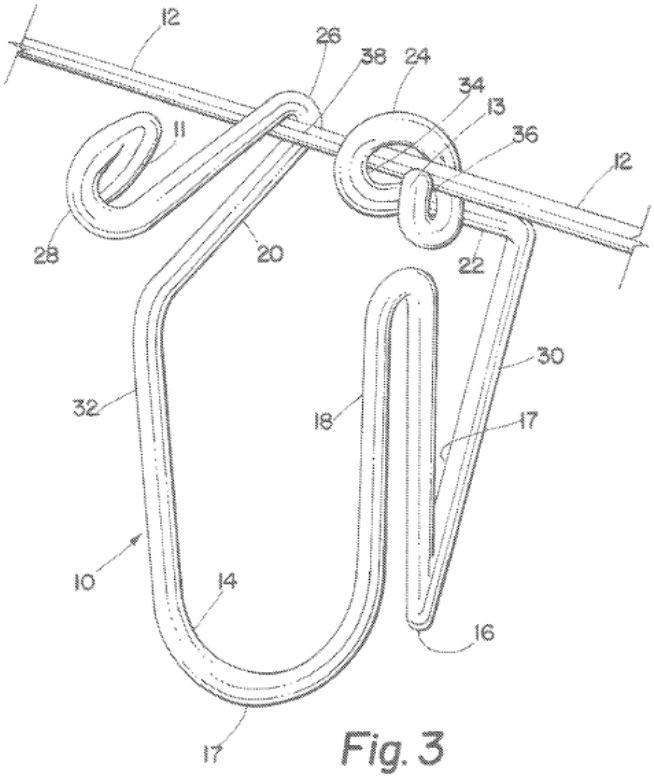


Fig. 3

Id., Fig. 3.

The ’291 Patent further discloses and claims a purportedly inventive “locking arm” comprising a closed loop spiral to secure the cable hanger in place on the messenger wire. *Id.*, 1:63-65. The patent further describes the configuration of the hangers as having “two loops, one of which wraps around the messenger wire to effectively lock it in place and the other an open loop which simply latches onto the messenger wire.” *Id.*, 2:33-37. However, as disclosed in *CAB Catalog*, hangers comprising the two loops as disclosed and claimed in the ’291 Patent were well known in the art. *See* EX1006, 5, 14.

B. Prosecution History

During prosecution, the Examiner issued several rejections under 35 U.S.C. §103. Pertinent to this petition, on December 16, 2021, the Examiner issued a non-final rejection as to all pending claims as obvious under 35 U.S.C. 103 over prior art disclosed by Applicant in view of U.S. Patent No. 2,384,440 to Carr ("Hanger Device"). *Id.*, 149-163. Specifically, the Examiner noted that the Patent Owner admitted the prior art disclosed all elements of the pending independent claim 1:

> Applicant discloses that the prior art discloses a system for organizing a plurality of electrical cables extending from a plurality of solar panels; a messenger wire structured to be supported a distance above ground; and a plurality of cable hangers structured to be disposed along, and suspended from, the messenger wire (see pages 2 and 3 of the specification).

Id., 152. In citing the specification, the Examiner referenced the admission in the "Background of the Invention" section of the application that extensively discussed the use of hangers in solar power plants in view of newly issued safety codes in the NEC. *Id.*, 3-4.

> ***In solar power plants***, mining and other electrical applications, there are various sized wires and bundles of wires with an almost unlimited variety of wire bundle sizes. Bundle size is becoming very important in the manufacture of ***hangers*** to accommodate these various sizes, especially in ***multiple carrier hangers***.
> …
> There is also the new NEC code which went into effect Jan. 1, 2014, which states that all AC and DC wiring must now be separated in any hanging or support system. Because of these changes, the wire management systems are much more complex, especially given the vast

> number of wires involved in ***a utility scale solar power plant***. With these changes, ***the hangers*** are initially installed on the messenger wire with a captive top spiral loop, and the bundles of cables are loaded separately in ***the carrier or carriers of the hanger***.

Id. Accordingly, in view of these admissions concerning the state of the art, the Examiner further noted that substituting one hanger for another would be obvious:

> Because both the prior art disclosed by Applicant and Carr disclose cable hangers for supporting a plurality of cables on a messenger wire, ***it would have been obvious to one ordinary skill in the art at the effective filing date of the present invention, to substitute one cable hanger for the other***, to achieve the predicable result of a plurality of cable hangers, each able to support a plurality of cables from a messenger wire in a side by side arrangement.

EX1015, 152.

In response, on March 16, 2022, the Patent Owner did not amend the claims or attempt to distinguish Carr, nor did the Patent Owner dispute that cable hangers having the claimed arrangement and features were known in the art. *Id.*, 199-200. Rather, the Patent Owner submitted an inventor's declaration stating, without any support, that "in late 2013 … messenger wire/hanger arrangements had never been employed in the solar industry." *Id.*, 201-202. Additionally, the declaration attempted to walk back the admissions in the application regarding the use of hangers in the solar industry by stating (again, entirely without support) that "references to the use of arrangements or portions thereof in regard to the solar industry were not to any publicly known/available arrangement by any other(s)." *Id.*, 202. However,

the declaration also admits that hundreds of different cable hanger designs, for above ground and underground use, existed at the time of the invention. *Id*. Immediately following this conclusory and unsupported Patent Owner declaration, the Examiner allowed all pending claims. *Id.*, 211-213.

V. LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art may be reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). A person of ordinary skill in the art at the time of the purported invention ("POSITA") 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, with the understanding that the number of years of experience could be higher or lower given the level of education and vice versa. EX1002 ¶48.

VI. CLAIM CONSTRUCTION

Claims in an IPR are construed using the same standard used in civil actions under 35 U.S.C. §282(b), in accordance with the ordinary and customary meaning as understood by a POSITA and the prosecution history. 37 C.F.R. §42.100(b). For the purposes of this proceeding only, Petitioner does not propose any claim terms for construction.

VII. STATEMENT OF PRECISE RELIEF REQUESTED

In accordance with 35 U.S.C. §311, Petitioner requests a finding that claims 1-23 of the ’291 Patent are unpatentable as follows:

Ground	Claims	References	Basis[2]
1	1-13	*CAB Catalog* in view of the knowledge of a POSITA	§103
2	14-23	*CAB Catalog* and *Almy* in view of the knowledge of a POSITA	§103

Sections VIII-IX detail statutory grounds of unpatentability for each of the challenged claims. Additional evidence is supplied in the accompanying Declaration of Dr. Beik (EX1002) and other supporting exhibits.

VIII. GROUND 1: Obviousness over *CAB Catalog* in View the Knowledge of a POSITA

Claims 1-13 of the ’291 Patent are obvious over *CAB Catalog* in view of the knowledge of a POSITA. EX1002 ¶¶51-98.

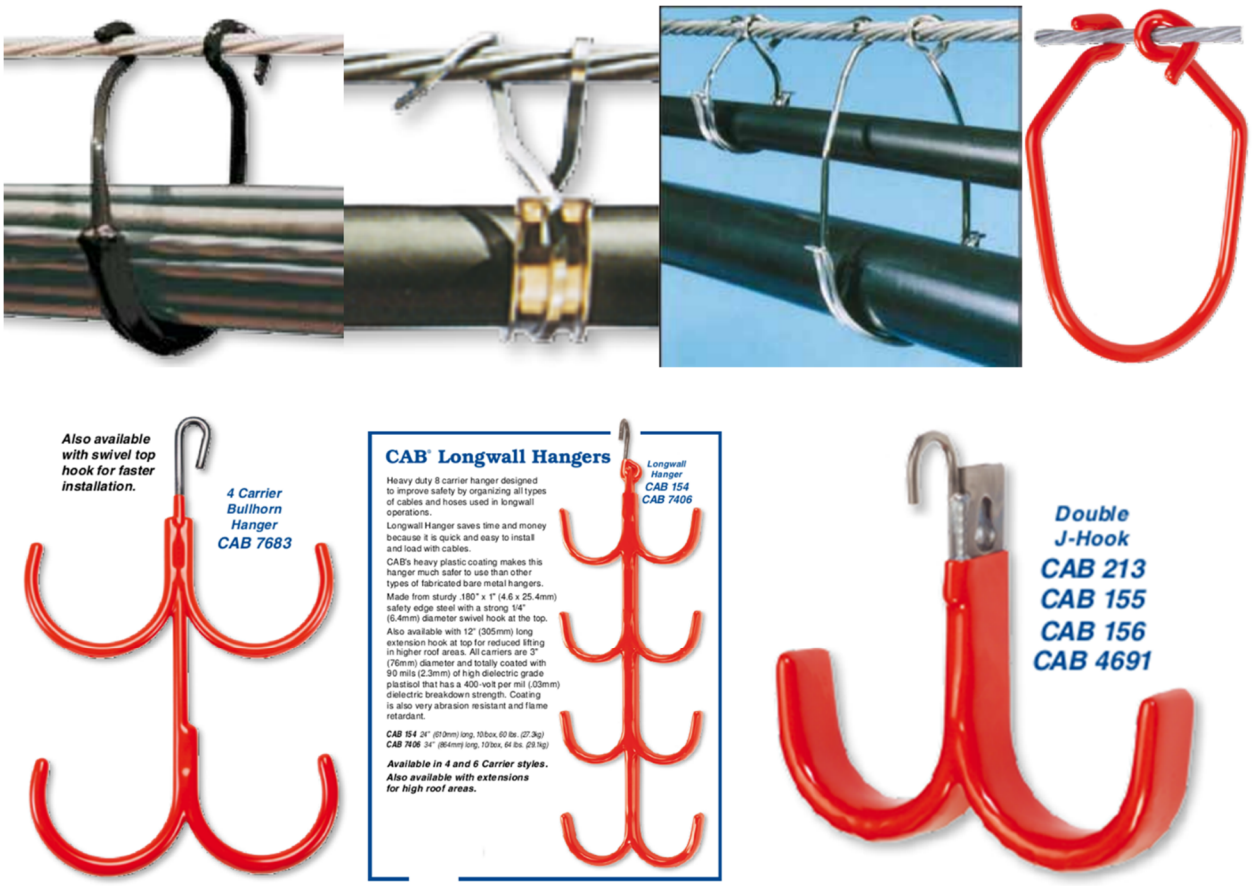
[2] Because the ’291 Patent has a priority date after March 16, 2023, the post-AIA statute applies.

A. Claim-by-Claim Analysis

1. 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:

Should the preamble be construed as limiting, *CAB Catalog* in view of the knowledge of a POSITA renders it obvious. *CAB Catalog* discloses a system of organizing a plurality of electrical cables comprising cable hangers, rings, saddles and clips suspended from a messenger wire. *See, e.g.*, EX1006, 5 ("CAB Bosserman Clips are widely respected for their superior ability to safely suspend electrical cables and wiring in a variety of underground applications…. Extra Long Styles available for running 2 cables separately from 1 messenger wire or large bundles of cables."), 9 ("CAB Stacked J-Hooks Heavy duty 2-carrier hangers for supporting pipe and cables from roof, side or structure."), 14 ("CAB Cable Rings are manufactured in standard, medium and long styles. Designed to tightly fit on an exact messenger wire size to prevent slippage. Medium and long style rings have extra length for bundles of cables or for running several cables independently from same messenger wire.").



Id., 5, 9-11, 14.

Further, a POSITA would have been motivated to modify the teachings of *CAB Catalog* for use in solar installations with a plurality of solar panels. EX1002 ¶¶52-55. Modifying the teachings of *CAB Catalog* would have involved routine implementation, would have posed no technical risk, and would have achieved predicable benefits of improving wire runs in solar installations. *Id. Id.*, 202. In fact, Patent Owner admitted that it had made and sold hundreds of different cable hanger variations before the invention. EX1015, 202.

As discussed above, for decades before the priority date, cable hangers and messenger wires had been used to support and organize various types of current carrying cables and data cables in many industries and applications. The challenge of cable management was a problem that the solar industry had in common with the variety of electrical industries using the prior art cable management systems. EX1002 ¶52; *see also* EX1001, 1:18-22 ("This invention has to do with a locking cable hanger system for use in the solar, mining, and electrical industries. In solar, mining, and electrical industries there is a need for electrical cables to extend from a power or signal source to a location of application."). Therefore, a POSITA would have looked to those prior art cable management systems to address the similar challenges of cable support and management in the solar industry.

Thus, there was ample motivation to use the hangers disclosed in *CAB Catalog* to organize a plurality of electrical cables extending from a plurality of solar panels. Moreover, there was an express motivation to use cable hangers such as those disclosed in *CAB Catalog* in the solar industry—the 1984 joint report from the Jet Propulsion Laboratory and Underwriters' Laboratories explained that "a messenger with rings and saddles for conductor support" is a "practical PV application … for terrestrial arrays located away from the building." EX1007, 39. Similarly, in 2012, SnakeTray released a "cable tray system" that comprised a plurality of spaced apart hangers designed to be suspended from a messenger wire for use in solar

installations. EX1008. Further, standardized safety codes at the time of the invention disclosed suspending current-carrying wires using cable hangers hung from a messenger wire. *See* EX1009, 241 ("An exposed wiring support system using a messenger wire to support insulated conductors by any one of the following: (1) ***A messenger with rings and saddles for conductor support*** [or] (2) ***A messenger with a field-installed lashing material for conductor support***."). Doing so would have yielded predictable results and reasonable expectation of success because the teachings of *CAB Catalog* employ well-known wire management devices and techniques to address the same issues in the solar industry and comply with industry standards. EX1002 ¶55.

Accordingly, *CAB Catalog* in view of the knowledge of a POSITA renders this limitation obvious.

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

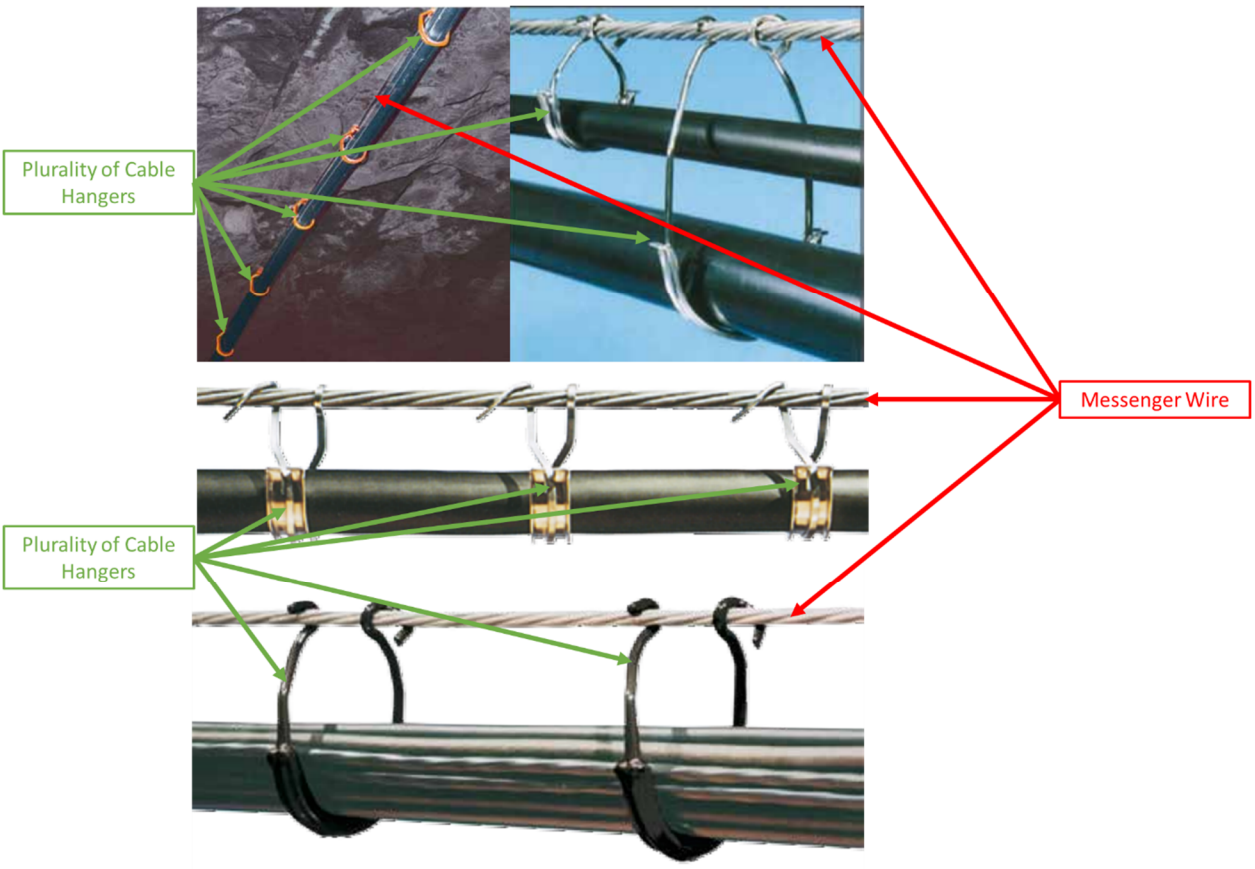
CAB Catalog renders this limitation obvious. *CAB Catalog* explicitly discloses the use of a messenger wire to support cable hangers, rings, saddles and clips suspended from a messenger wire. *See, e.g.*, EX1006, 5 ("Extra Long Styles available for running 2 cables separately from 1 ***messenger wire*** or large bundles of cables."), 8 ("Designed to hang from ***messenger wire*** or beltline structure"), 14 ("This advanced roll-form design, combined with the strong spring temper of the

wire, provides a tight, secure attachment of the cable ring to the ***messenger wire***…. CAB Cable Rings are manufactured in standard, medium and long styles. Designed to tightly fit on an exact ***messenger wire*** size to prevent slippage. Medium and long style rings have extra length for bundles of cables or for running several cables independently from same messenger wire.").

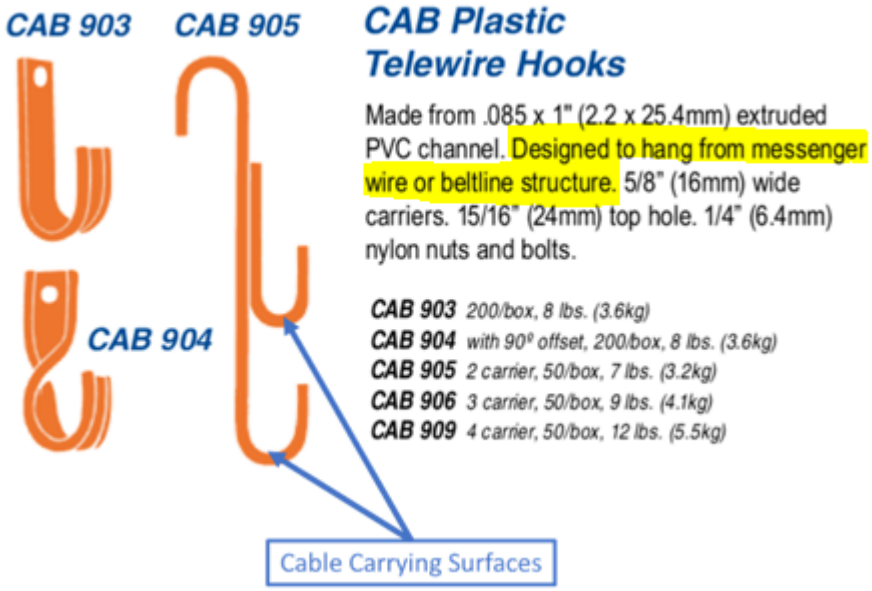
Id. In view of this explicit disclosure, *CAB Catalog* renders this limitation obvious. *See* EX1002 ¶¶57-58.

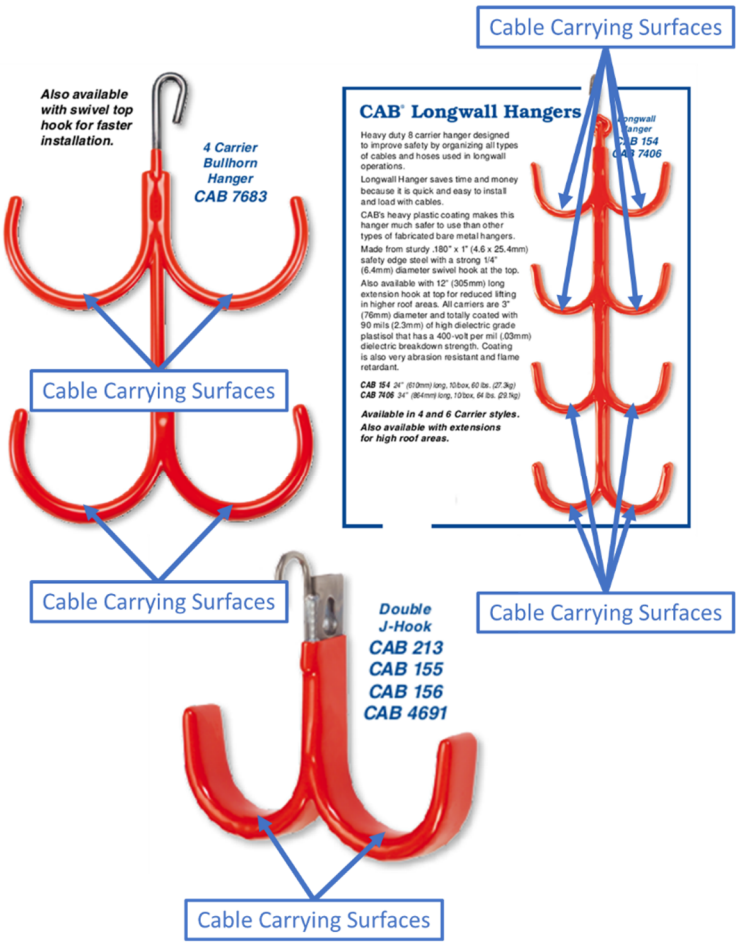
c. 1[c]: a plurality of cable hangers structured to be disposed along, and suspended from, the messenger wire, each cable hanger having a plurality of cable carrying surfaces, each cable carrying surface being structured to support at least one electrical cable of the plurality of electrical cables,

CAB Catalog also renders limitation 1[c] obvious. *CAB Catalog* discloses a plurality of cable hangers disposed along, and suspended from, a messenger cable:



See EX1006. *CAB Catalog* also discloses cable hangers having a plurality of (*i.e.*, more than one) cable carrying surfaces. *See, e.g.*, *id.*, 8-11.





Moreover, a POSITA would have found it obvious to modify CAB's cable clips, rings, and saddles to have a plurality of cable carrying surfaces. *See* EX1002 ¶62. For example, the simple design of the CAB cable clips, rings, and saddles would allow a POSITA to modify their design to include additional cable carrying surfaces. *See id.*

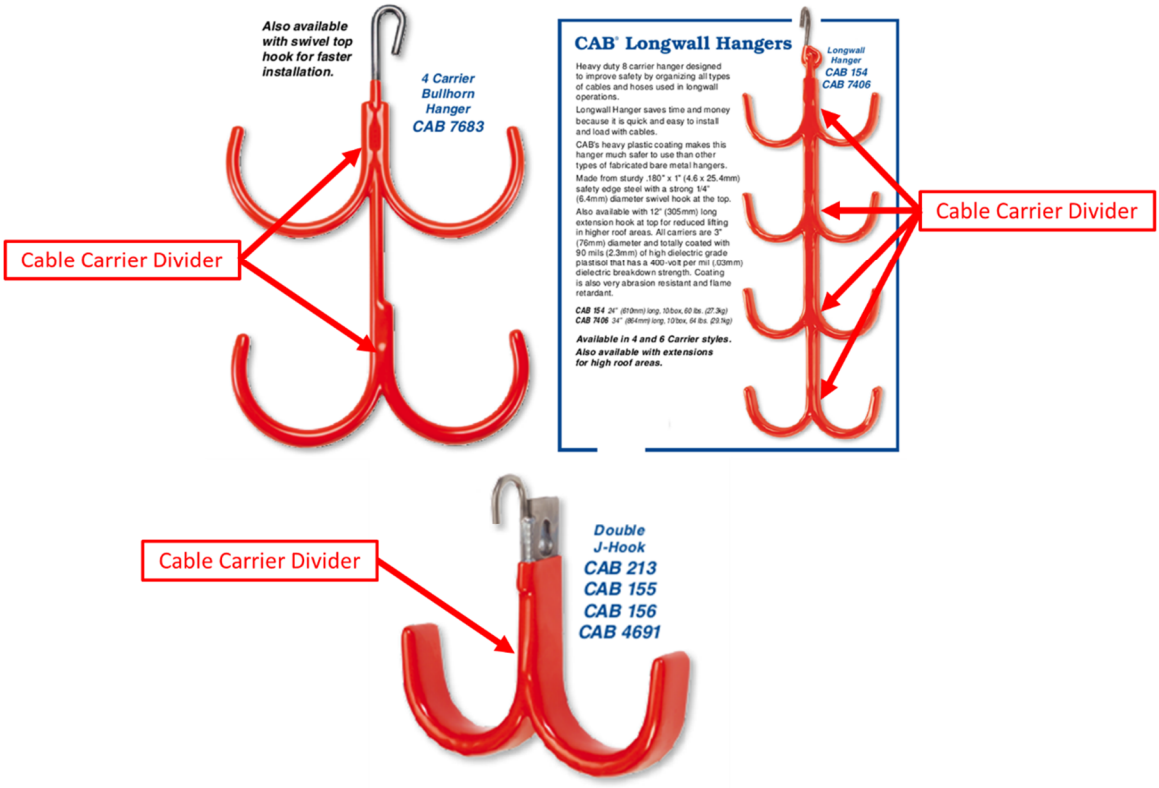
CAB Catalog further teaches that each cable carrying surface is structured to support at least one electrical cable. *See, e.g.*, EX1006, 5 ("CAB Bosserman Clips are widely respected for their superior ability to safely suspend ***electrical cables*** and

wiring"), 9 ("Safe, strong support for ***electrical cables***, hoses and pipes."), 14 ("CAB Cable Rings provide maximum strength and safety for the support of ***all types of aerial cables***…. For added safety and protection, any style ring can be ***totally insulated*** with a tough, 80 mil (2mm) coating of ***high dielectric grade*** PVC plastisol."); *see also* EX1002 ¶61.

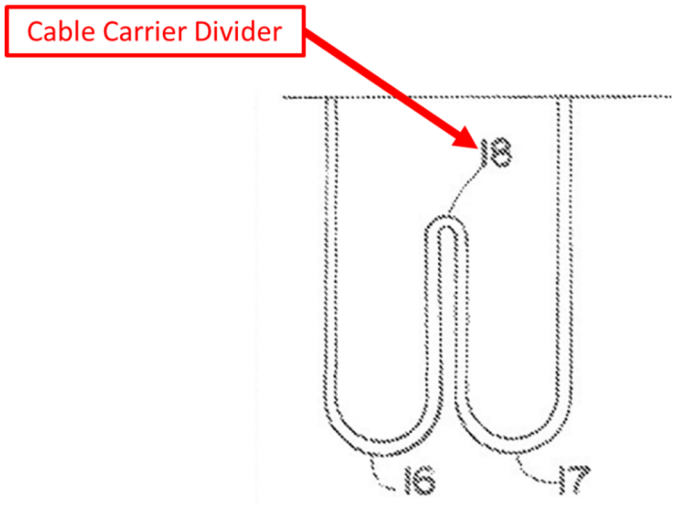
Thus, *CAB Catalog* renders this limitation obvious.

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

CAB Catalog renders this limitation obvious. *CAB Catalog* discloses several examples of cable hangers and J-hooks with a plurality of cable carrying surfaces. *E.g.*, EX1006, 9-11. As shown below, the cable hangers and J-hooks in *CAB Catalog* include a cable carrier divider between cable carrying surfaces:



EX1006, 9-11. Notably, the style of dividers disclosed by *CAB Catalog* are nearly identical to a divider identified as "18" in Figure 23 of the '291 Patent:



EX1001, Figure 23 (excerpted and annotated), 10:5-7. Accordingly, *CAB Catalog* renders this limitation obvious.

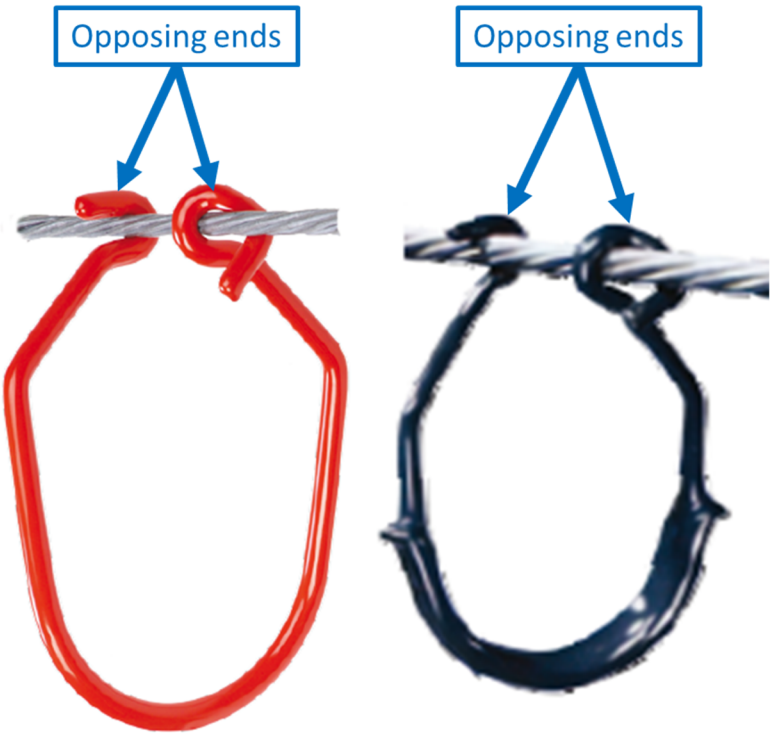
2. Independent Claim 6

a. 6[a]-6[c]: 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 each cable hanger of the plurality of cable hangers comprises:

Limitations 6[a]-6[c] are identical to limitations 1[a]-1[c]. As explained above, *CAB Catalog* renders these limitations obvious. *See* §§VIII.A.1.a-c.

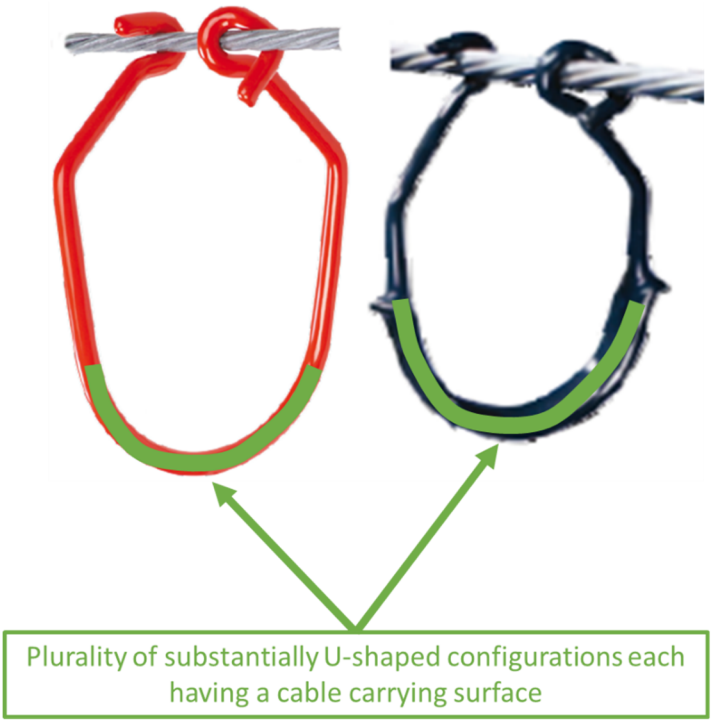
b. 6[d]: a high tensile strength wire with two opposing ends and configured intermediate of said ends to form a plurality of substantially U-shaped configurations each having a cable carrying surface of the plurality of cable carrying surfaces located thereon;

CAB Catalog renders this limitation obvious. First, *CAB Catalog* discloses "a high tensile strength wire with two opposing ends." *CAB Catalog* explains that its cable clips, rings, and saddles are "manufactured from high tensile spring steel in rolled flat wire form." EX1006, 5, 14. *CAB Catalog* makes clear that the cable clips, rings, and saddles are made from a single piece of wire with two opposing ends:



EX1006, 5, 14.

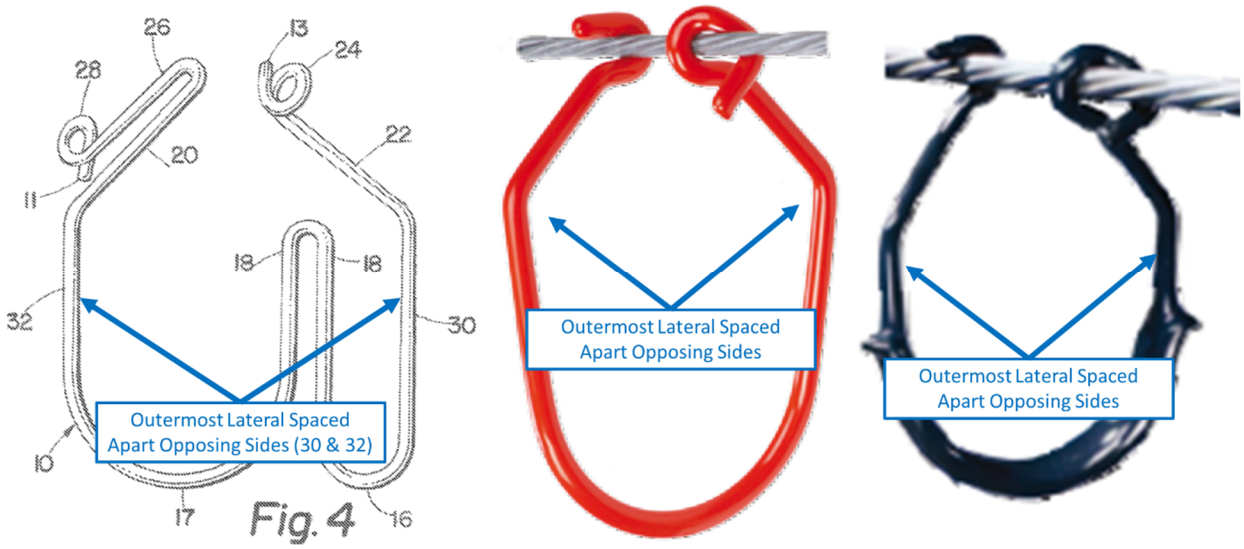
Second, *CAB Catalog* discloses that its cable clips, rings, and saddles are "configured intermediate of said ends to form a plurality of substantially U-shaped configurations each having a cable carrying surface of the plurality of cable carrying surfaces located thereon." As shown in the annotated figure below, *CAB Catalog*'s cable clips, rings, and saddles form substantially U-shaped configurations each having a cable carrying surface:



Id. Moreover, a POSITA would have found it obvious to modify CAB's cable clips, rings, and saddles to have a plurality of U-shaped cable carrying surfaces. *See* EX1002 ¶71. For example, the simple design of the CAB cable clips, rings, and saddles would allow a POSITA to modify their design to include additional cable carrying surfaces. *See id.* Thus, *CAB Catalog* renders this limitation obvious.

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

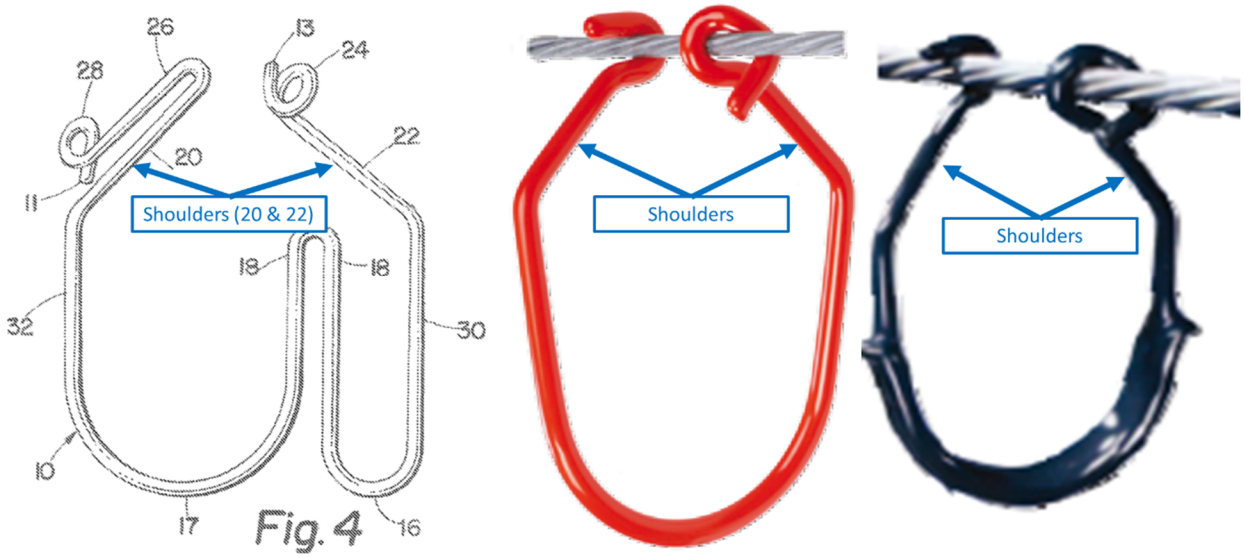
CAB Catalog renders limitation 6[e] obvious. As shown in the annotated figure below, *CAB Catalog*'s cable clips, rings, and saddles each have outermost lateral spaced apart opposing sides that form the boundary of the hangers:



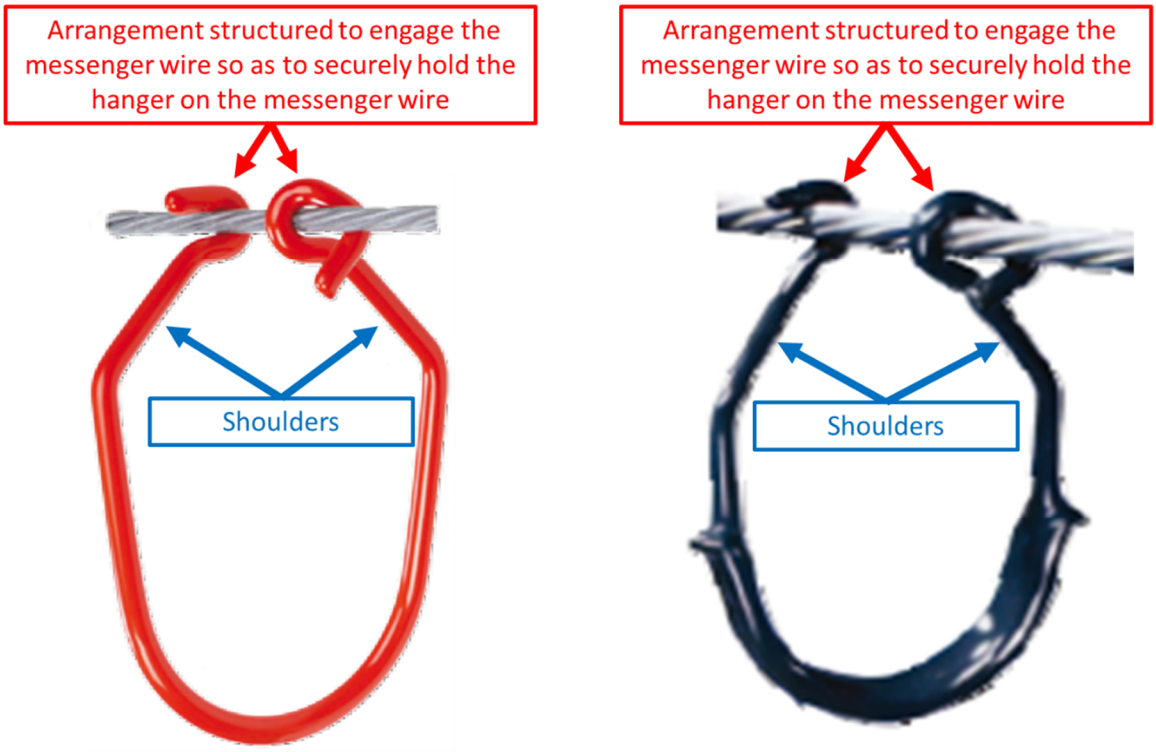
EX1006, 5, 14. Accordingly, *CAB Catalog* discloses limitation 6[e] and renders it obvious.

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.

CAB Catalog discloses limitation 6[f]. As shown in the annotated figure below, *CAB Catalog*'s cable clips, rings, and saddles each have shoulders extending toward each other from said spaced apart opposite sides:



EX1006, 5, 14. Further, *CAB Catalog*'s cable clips, rings, and saddles each have "an arrangement structured to engage the messenger wire so as to securely hold the hanger on the messenger wire":

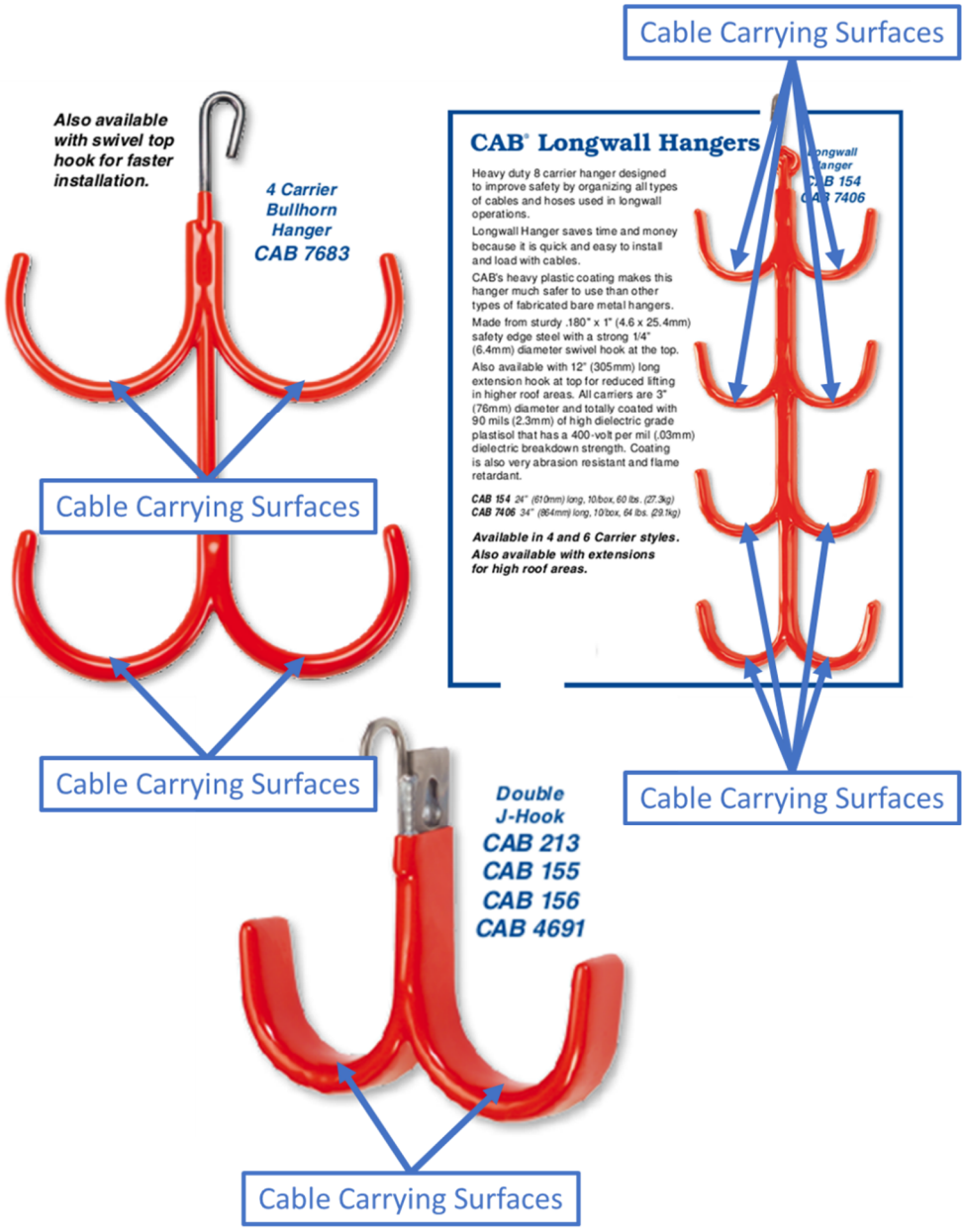


Id. Accordingly, *CAB Catalog* discloses all elements of limitation 6[f] and renders it obvious.

3. Dependent Claims

a. Claims 2, 3, and 4: The system of claim 1, wherein the plurality of cable carrying surfaces comprises at least [three/four/five] cable carrying surfaces.

CAB Catalog renders obvious the limitations in claims 2, 3, and 4. As shown below, *CAB Catalog* discloses several examples of cable hangers and J-hooks with a plurality of cable carrying surfaces:



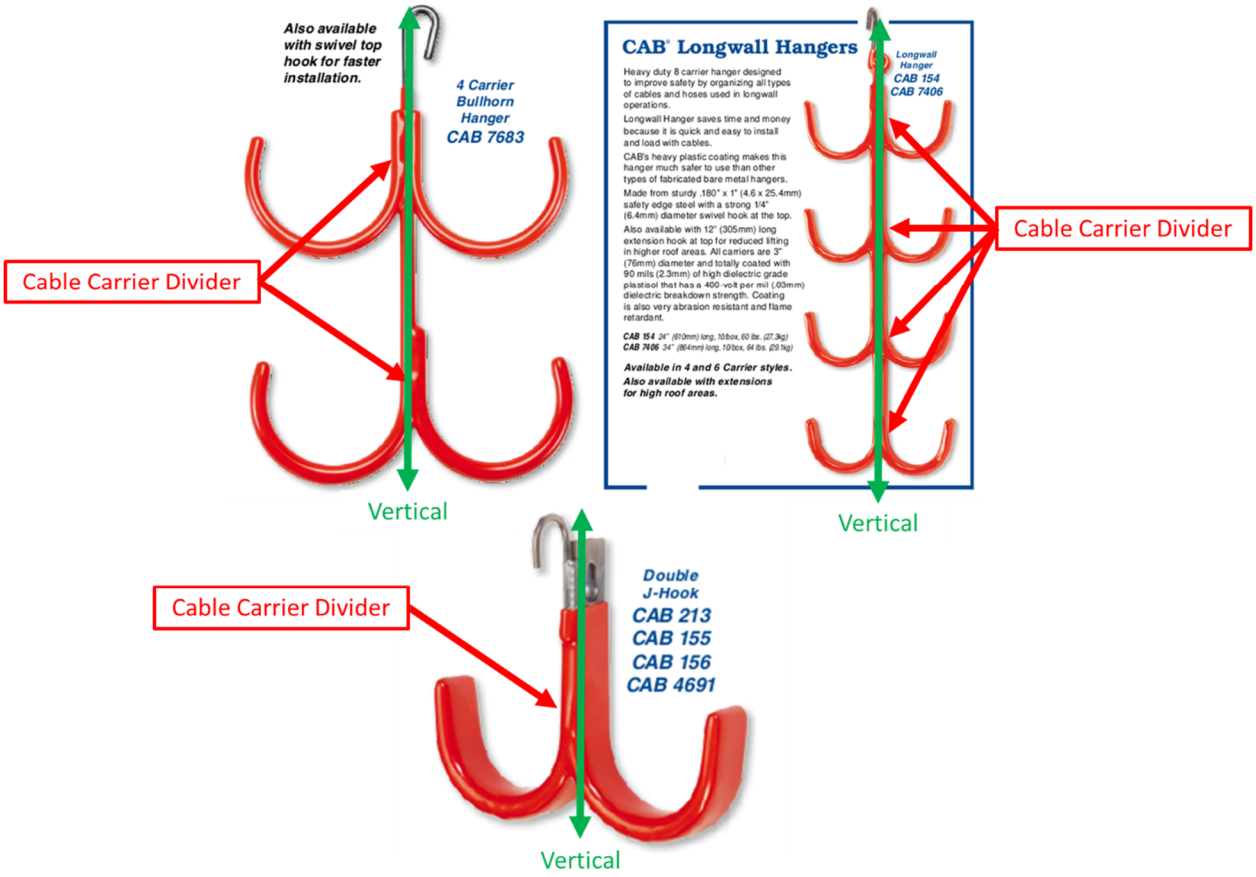
EX1006, 9-11; *see also id.*, 10 ("Heavy duty 8 carrier hanger designed to improve safety by organizing all types of cables … Available in 4 and 6 Carrier styles."), 11 ("2 Carrier Bullhorn Hanger … 4 Carrier Bullhorn Hanger").

Thus, in view of *CAB Catalog*'s explicit disclosure of hangers comprising 2-8 cable carrying surfaces, a POSITA would have found it obvious to create the

system of claim 1 wherein the plurality of cable carrying surfaces comprise at least [three/four/five] cable carrying surfaces. Further, due to their simple design, a POSITA would have found it obvious to modify CAB's cable clips, rings, and saddles to have at least three to five cable carrying surfaces. EX1002 ¶79.

b. Claim 5: The system of claim 1, wherein the cable carrier divider extends vertically.

CAB Catalog renders this limitation obvious. *CAB Catalog* discloses several examples of cable hangers and J-hooks with a plurality of cable carrying surfaces. *E.g.*, EX1006, 9-11. As shown below, the cable hangers and J-hooks in *CAB Catalog* include a cable carrier divider extending vertically between cable carrying surfaces:

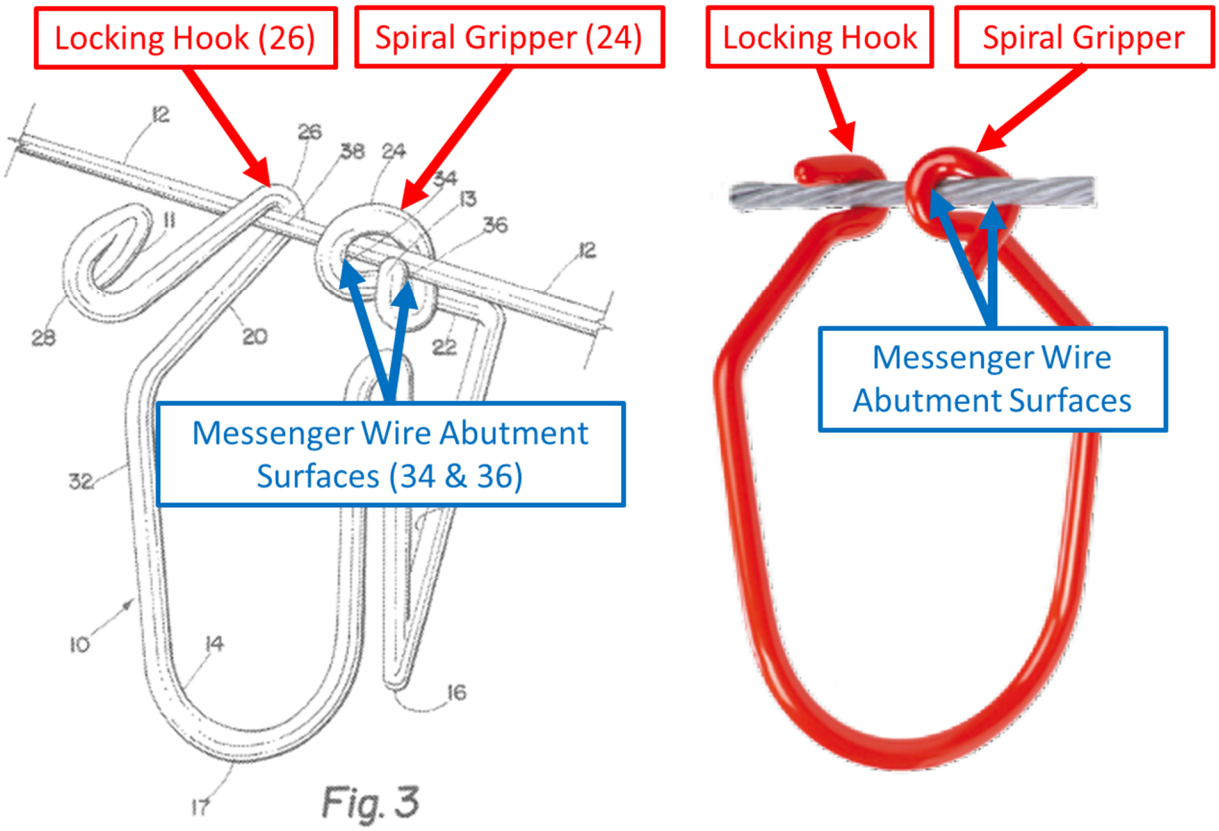


EX1006, 9-11. Accordingly, *CAB Catalog* renders this limitation obvious.

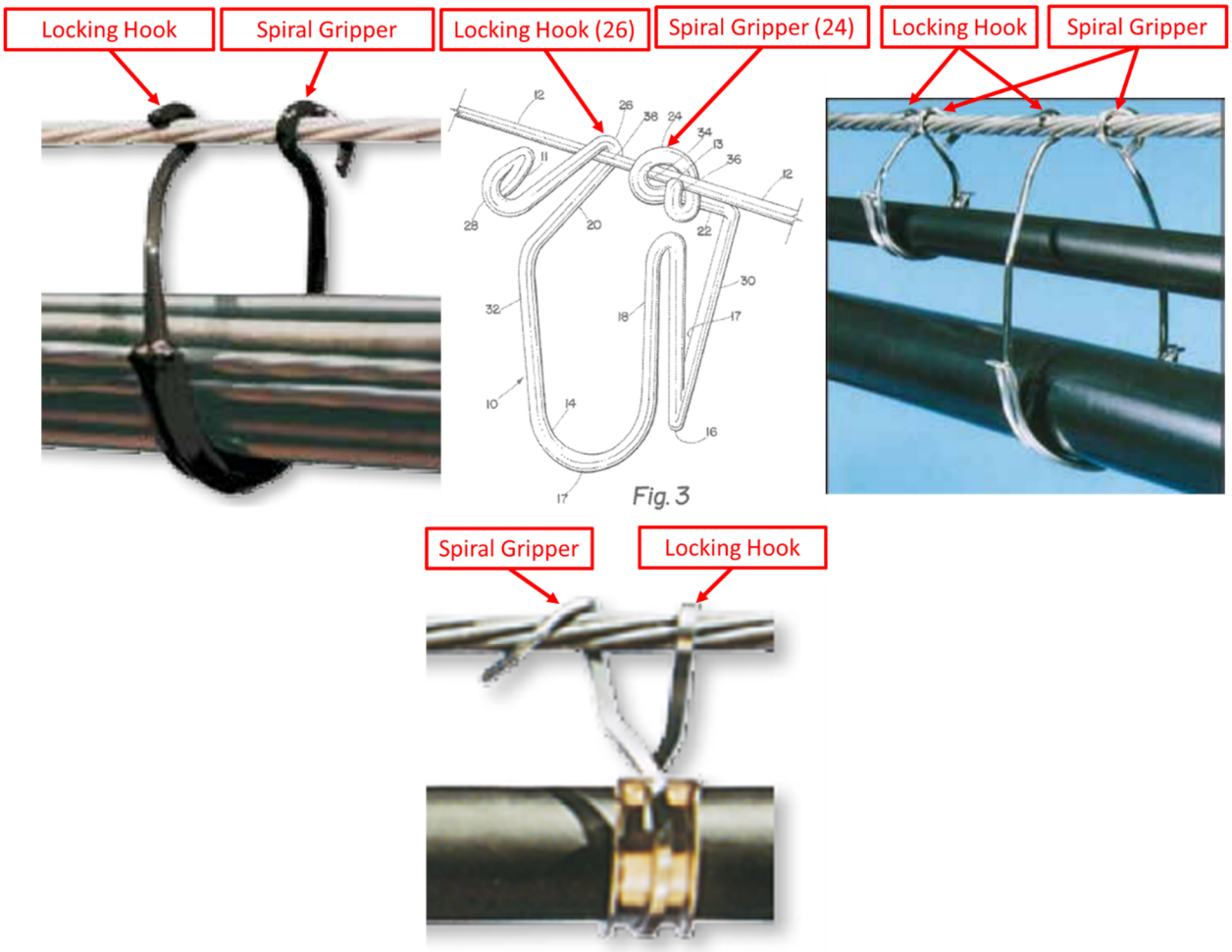
c. Claim 7: The system of claim 6, wherein the arrangement of one of the shoulders that is structured to engage the messenger wire is a spiral gripper formation and the arrangement of the other shoulder that is structured to engage the messenger wire is a locking hook.

CAB Catalog renders this limitation obvious. Specifically, the section displaying and discussing CAB's "Bosserman Clips" explicitly discloses the "spiral gripper" and "locking hook" limitations. As shown in the figures below, *CAB*

Catalog's Bosserman clips feature shoulders that have a "locking arm" that engages the messenger wire at two messenger wire abutment surfaces:



Similarly, the section of *CAB Catalog* displaying and discussing the CAB Cable Rings and Saddles disclose a nearly identical spiral gripper and locking hook configuration:



EX1006, 5, 14. Accordingly, *CAB Catalog* discloses this limitation and renders it obvious.

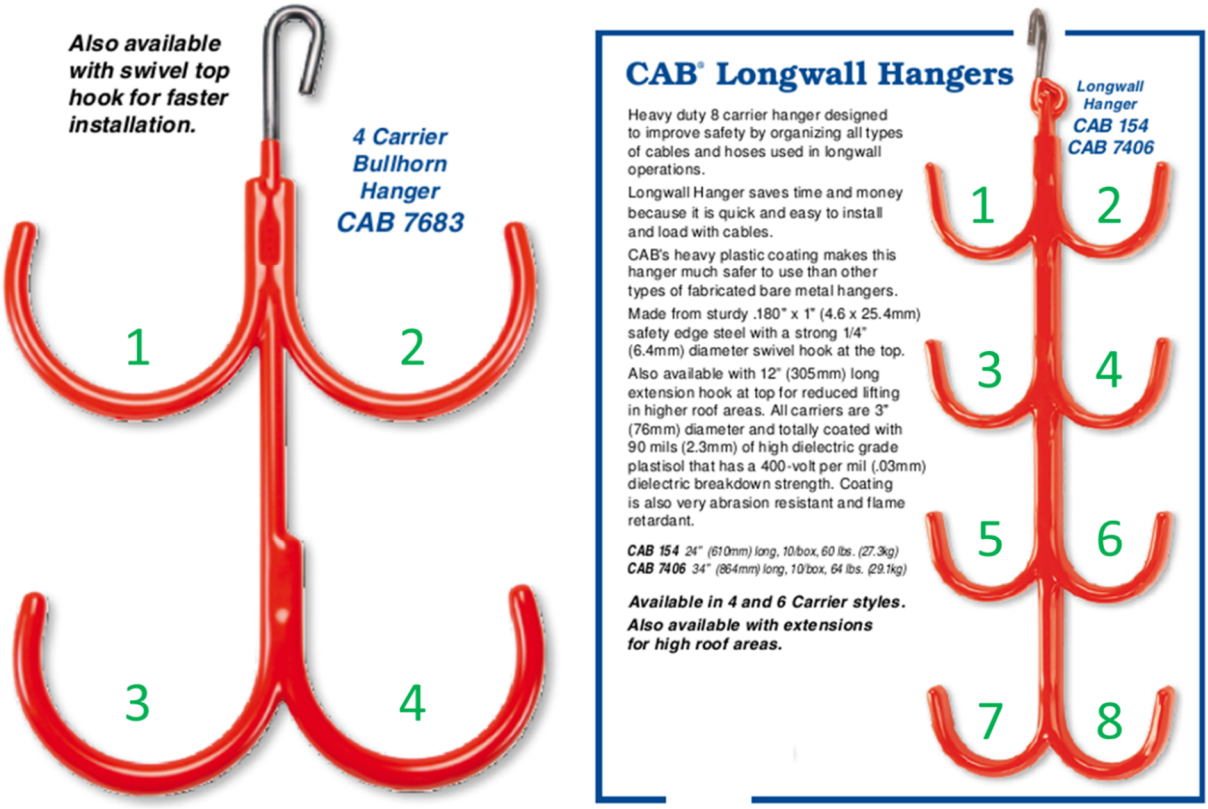
d. Claim 8: The system of claim 1, wherein each cable hanger of the plurality of cable hangers comprises a wire selected from the group of round galvanized steel, round stainless steel, flat rolled galvanized steel, flat rolled stainless steel.

CAB Catalog renders this limitation obvious. *CAB Catalog* explicitly discloses that its cable rings and saddles are manufactured from high tensile wire

made of "galvanized steel, copper clad steel or type 316 stainless steel." EX1006, 14. Thus, *CAB Catalog* explicitly discloses and renders claim 8 obvious.

e. Claim 9: The system of claim 1, wherein each cable hanger of the plurality of cable hangers further comprises a formation structured to support a data carrier.

CAB Catalog renders the limitation of claim 9 obvious. *CAB Catalog* discloses a cable hanger with a plurality of cable carrying surfaces, all of which are suitable to support a data carrier separately from current carrying cables. For example, in annotated the annotated figures below, a POSITA would understand that a data carrier could be supported on surfaces 1 or 2, while current carrying cables could be supported on at least surfaces 3-8, or vice versa:

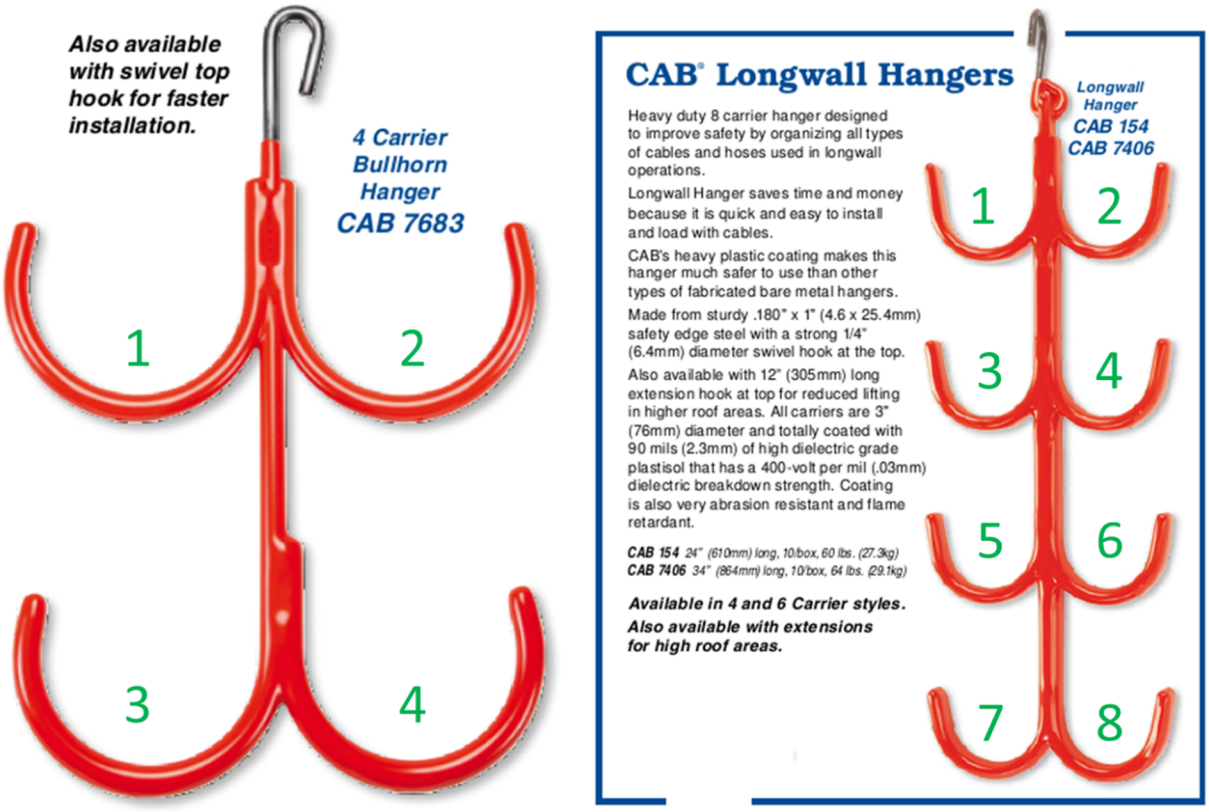


EX1006, 10-11; EX1002 ¶¶87-88. Because a POSITA would have understood that interference from current carrying cables was a known risk, a POSITA would have positioned a data carrier separate from the current carrying cables. EX1002 ¶¶32-37, 87. Thus, *CAB Catalog* renders this limitation obvious.

f. Claim 10: The system of claim 9, wherein the formation structured to support the data carrier is positioned closer to the messenger wire than the cable carrying surfaces.

CAB Catalog also renders this limitation obvious. As discussed in Section VIII.A.3.e, *CAB Catalog* discloses a cable hanger with a formation structured to support a data carrier. It would have been an obvious choice to position the data

carrier closer to the messenger than the current carrying cables. *See* EX1002 ¶¶89-90. For example, in the annotated figures below, a POSITA would understand that a data carrier could be supported on surfaces 1 or 2, while current carrying cables could be supported on at least surfaces 3-8.



EX1006, 10-11. Because a POSITA would have understood that interference from current carrying cables was a known risk, a POSITA would have sought to maximize the distance between the data carrier and the current carrying cables. *See* EX1002 ¶¶32-37, 89. Positioning the data carrier at the extreme upper end of the hanger structure would allow a POSITA to position the current carrying cables on lower

tiers and minimize the risk of interference. *See id.* Thus, *CAB Catalog* renders this limitation obvious.

g. Claim 11: The system of claim 1, wherein each cable hanger of the plurality of cable hangers includes a plastisol or PVC coating.

CAB Catalog renders this limitation obvious. Throughout *CAB Catalog*, the disclosed cable hangers, cable hooks, cable rings, and cable saddles all have plastisol coating. *See, e.g.*, EX1006, 2 ("100% ***Plastisol Coated*** Round Wire Cable Clips"), 3 ("All hanger carrying surfaces are fully insulated with a tough, high dielectric grade, flame retardant ***plastisol coating***."), 5 ("CAB Bosserman Clips feature a 100% ***plastisol coated*** high tensile spring steel body …."), 10 (All carriers are … totally ***coated with*** 90 mils (2.3mm) of ***high dielectric grade plastisol*** …."), 14 ("any style ring can be totally insulated with a tough, 80 mil (2mm) ***coating of high dielectric grade PVC plastisol***.").

Further, *CAB Catalog* provides an express motivation to coat cable hangers, cable hooks, cable rings, and cable saddles with plastisol: it repeatedly explains that the coating provides the "added safety and protection" of being an insulator (*i.e.*, is dielectric), resisting abrasion, resisting corrosion, and being flame retardant. *See id.*; EX1002, ¶92. Thus, *CAB Catalog* literally discloses the limitations of claims 11 and 23 and renders them obvious.

h. Claim 12: The system of claim 11, wherein the coating has a thickness in the range of from 50 mils to 100 mils thick.

CAB Catalog renders this limitation obvious. For example, in discussing the CAB Cable Rings and Saddles that are used with messenger wire, *CAB Catalog* explains that "[f]or added safety and protection, any style ring can be totally insulated with a tough, ***80 mil (2mm) coating of high dielectric grade PVC plastisol***." EX1006, 14. More broadly, throughout *CAB Catalog*, the disclosed cable hangers, cable hooks, cable rings, and cable saddles all have plastisol coating within the claimed 50 mils to 100 mils range. *See, e.g.*, *id.*, 10 (All carriers are 3" in diameter and totally ***coated with 90 mils (2.3mm) of high dielectric grade plastisol*** …."). Both 80 mils and 90 mils are squarely within the claimed range of 50-100 mils thick. Thus, because *CAB Catalog* discloses examples of plastisol coating with a thickness within the claimed range, 80 mils and 90 mils, it renders this limitation obvious. *See Genentech, Inc. v. Hospira, Inc.*, 946 F.3d 1333, 1340-41 (Fed. Cir. 2020) ("we and our predecessor court have consistently held that even a slight overlap in range establishes a prima facie case of obviousness"); *see also In re Haase*, 542 Fed. Appx. 962, 965-66 (Fed. Cir. 2013).

Additionally, *CAB Catalog* provides an express motivation to coat cable hangers, cable hooks, cable rings, and cable saddles with plastisol within the claimed range: it explains that coating of that thickness provides strong ("total") insulation,

is very abrasion resistant, and is flame retardant, providing abrasion resistance, and being flame retardant. *See* EX1006, 10, 14; EX1002 ¶95. Thus, *CAB Catalog* renders the plastisol thickness limitation of claim 12 obvious.

i. Claim 13: The system of claim 1, wherein each cable hanger of the plurality of cable hangers includes a coating having a flame retardant, high dielectric grade, UV inhibited material.

CAB Catalog renders this limitation obvious. Throughout *CAB Catalog*, the disclosed cable hangers, cable hooks, cable rings, and cable saddles all have plastisol coating that is a "flame retardant, high dielectric grade, UV inhibited material." *See, e.g.*, EX1006, 2 ("coated over the entire surface with abrasion resistant, ***high dielectric grade plastisol*** for total insulation"), 3 ("All hanger carrying surfaces are fully insulated with a tough, ***high dielectric grade, flame retardant plastisol coating***."), 5 ("***High dielectric grade plastisol*** applied on 100% of the hanger surface"), 10 (All carriers are … totally ***coated with*** 90 mils (2.3mm) of ***high dielectric grade plastisol*** …. Coating is also very abrasion resistant and ***flame retardant***."), 14 ("any style ring can be totally insulated with a tough, 80 mil (2mm) ***coating of high dielectric grade PVC plastisol***.… CAB's Award Winning PVC coated Rings and Saddles have a heavy coating of ***high dielectric grade, UV stabilized PVC plastisol***.").

Additionally, *CAB Catalog* provides an express motivation to coat cable hangers, cable hooks, cable rings, and cable saddles with plastisol within the claimed range: it explains that coating of that thickness provides strong ("total") insulation, is very abrasion resistant, and is flame retardant, providing abrasion resistance, and being flame retardant. *See* EX1006, 10, 14; EX1002 ¶98. Thus, *CAB Catalog* renders the plastisol thickness limitation of claim 12 obvious.

IX. GROUND 2: Obviousness over *CAB Catalog* and *Almy* in View the Knowledge of a POSITA

Claims 14-23 of the '291 Patent are obvious over *CAB Catalog* in view of Almy and the knowledge of a POSITA. EX1002 ¶¶100-127.

A. Motivation to Combine

A POSITA would have been motivated to combine *CAB Catalog* and *Almy*, as explained below and supported by the Beik Decl. EX1002 ¶100-103. Combining the teachings of *CAB Catalog* and *Almy* would have involved routine implementation, would have posed no technical risk given their complementary teachings, and would have achieved predicable benefits of improving wire runs in solar installations by separating conductors and implementing a more robust hanger.

CAB Catalog discloses a wide variety of hangers for supporting "electrical cables" from messenger wire, plates, or other structures. EX1006, 2, 8-9. The "multi carrier hooks" described in *CAB Catalog* are designed to organize "sensor,

communication, control and electrical wiring [and are] useful … when running multiple cables." *Id.*, 7. Thus, *CAB Catalog* teaches multi-carrier hooks and hangers for suspending electrical cables from structures such as a messenger wire. EX1002 ¶100.

Like *CAB Catalog*, *Almy* is directed to "supporting bundles of electrical cables." EX1004 ¶[0002]. *Almy* recognizes the need for a "wire-based hanging wire-way for … supporting a bundle of electrical cables between photovoltaic modules or module groups." *Id.* ¶[0012]. For this need, *Almy* teaches the use of "a plurality of periodic independent wire loops." *Id*. ¶[0022]. Each such wire loop "is adapted to receive a bundle of electrical cables." *Id*. The diameter of each wire loop depends on the "thickness of the bundle of electrical cables at a particular point, e.g. between specific photovoltaic module groups." *Id*. Thus, *Almy* discloses a cable support system with wire loops for supporting bundles of cables extending from solar panels. EX1002 ¶101.

A POSITA would have recognized the disadvantages of using wire loops to suspend multiple types of electrical cables from a messenger wire. EX1002 ¶102. For example, there is a benefit to spacing apart current-carrying and non-current-carrying cables in order to prevent cross-linking. *Id*. Likewise, separating bundles of cables would result could improve the thermal profile of the system. *Id*. Accordingly, a POSITA would have been motivated to use the hangers, clips, and hooks disclosed

in *CAB Catalog* with the *Almy* solar power electrical wire-way system. *Id*. ¶¶102-103. Replacing the wire loops of *Almy* with the hangers, clips, and hooks in *CAB Catalog* would have yielded predictable results and reasonable expectation of success because the teachings of *CAB Catalog* and *Almy* are highly compatible, and employ well-known overhead wire management devices and techniques. *Id*.

B. Claim-by-Claim Analysis

1. Independent Claim 14

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

Almy renders limitation 14[a] obvious. *Almy* discloses a solar plant comprising a plurality of photovoltaic modules (*i.e.*, solar panels), cabling between those solar panels, and a system for organizing that cabling. *See, e.g.* EX1004 ("A plurality of photovoltaic modules or module groups may be electrically coupled to an electrical power distribution network, forming a photovoltaic system. Ground based power distribution networks require significant cabling between photovoltaic modules or discrete groups of modules, such as trackers or rows…. A wire-based hanging wire-way for photovoltaic modules or module groups and methods for supporting a bundle of electrical cables between photovoltaic modules or module groups are described herein."). Thus, a POSITA would understand *Almy*'s disclosure to teach this limitation. EX1002 ¶104.

There was also motivation to combine *Almy* with *CAB Catalog* to arrive at the additional limitations of claim 14. Because cable organization and support was a problem common to a variety of industries, a POSITA looking to organize a plurality of electrical cables within a solar plant would have also looked to cable management solutions in the mining industry. EX1002 ¶105; *see also* EX1001, 1:18-22 ("This invention has to do with a locking cable hanger system for use in the solar, mining, and electrical industries. In solar, mining, and electrical industries there is a need for electrical cables to extend from a power or signal source to a location of application."). Thus, there was ample motivation to combine the hangers disclosed in *CAB Catalog* with the solar plant wire management system of *Almy*. Accordingly, *CAB Catalog* and *Almy* render this limitation obvious.

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

Almy renders limitation 14[b] obvious. *Almy* discloses "a plurality of photovoltaic modules or module groups." *E.g.* EX1004. Photovoltaic modules are also known as "solar panels." EX1002 ¶107. Thus, a POSITA would understand *Almy*'s disclosure to teach this limitation. *Id.*

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

Almy renders limitation 14[c] obvious. *Almy* discloses, for example, that "[a] plurality of photovoltaic modules or module groups may be ***electrically coupled*** to

an electrical power distribution network, forming a photovoltaic system. Ground based power distribution networks ***require significant cabling between photovoltaic modules or discrete groups of modules***, such as trackers or rows…. A wire-based hanging wire-way for photovoltaic modules or module groups and methods ***for supporting a bundle of electrical cables between photovoltaic modules or module groups*** are described herein." *E.g.* EX1004. Thus, a POSITA would understand *Almy*'s disclosure to teach this limitation. EX1002 ¶¶108-109.

d. 14[d]-14[g]: a system for organizing the plurality of electrical cables, the system comprising: a messenger wire supported a distance above the ground adjacent the solar panels; and a plurality of cable hangers 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.

Limitation 14[d]-14[g] are analogous to limitations 1[a]-1[d]. As explained above, *CAB Catalog* renders these limitations obvious. *See* §§VIII.A.1.a-d.

2. Independent Claim 19

a. 19[a]-19[c]: A solar plant comprising: a plurality of solar panels; a plurality of electrical cables extending from the plurality of solar panels; and

Limitations 19[a]-19[c] are identical to limitations 14[a]-14[c]. As explained above, *Almy* renders these limitations obvious. *See* §§IX.B.1.a-c.

b. 19[d]-19[e]: a system for organizing the plurality of electrical cables, the system comprising: a messenger wire supported a distance above the ground adjacent the solar panels; and

Limitations 19[d]-19[e] are analogous to limitations 1[a]-1[b]. As explained above, *CAB Catalog* renders these limitations obvious. *See* §§VIII.A.1.b-c.

c. 19[f]: a plurality of cable hangers 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,

Limitation 19[f] is identical to limitation 14[f] and analogous to limitation 1[c]. As explained above, *CAB Catalog* renders this limitation obvious. *See* §§VIII.A.1.c, IX.B.1.d.

d. 19[g]-19[i]: wherein each cable hanger of the plurality of cable hangers comprises: "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; outermost lateral spaced apart opposing sides forming the boundary of said hanger; 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.

Limitations 19[g]-19[i] is analogous to limitations 6[d]-6[f]. As explained above, *CAB Catalog* renders these limitations obvious. *See* §§VIII.A.2.b-d.

3. Dependent Claims

a. Claims 15, 16, and 17: The solar plant of claim 14, wherein the plurality of cable carrying surfaces comprises at least [three/four/five] cable carrying surfaces.

Claims 15, 16, and 17 are analogous to claims 2, 3, and 4. As explained above, *CAB Catalog* renders these limitations obvious. *See* §VIII.A.3.a.

b. Claim 18: The solar plant of claim 14, wherein the cable carrier divider extends vertically.

Claim 18 is analogous to claim 5. As explained above, *CAB Catalog* renders these limitations obvious. *See* §VIII.A.3.b.

c. Claim 20: The solar plant of claim 14, 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.

CAB Catalog renders this limitation obvious, alone or in combination with *Almy*. First, *CAB Catalog* explicitly discloses that its cable rings and saddles are manufactured from high tensile wire made of "galvanized steel, copper clad steel or type 316 stainless steel." EX1006, 14. Thus, *CAB Catalog* renders claim 20 obvious. Similarly, *Almy* discloses cable-carrying loops constructed from wire made of materials including galvanized steel and stainless steel. EX1004, [0020]. A POSITA would have understood *Almy* to explicitly disclose the "round steel," "galvanized steel," and "stainless steel" limitations of claim 20 and render obvious the "flat

rolled" steel limitations of those claims. EX1002 ¶124. *CAB Catalog* and *Almy* explicitly disclose and render obvious all limitations of claim 20.

d. Claim 21: The solar plant of claim 14, 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.

Claim 21 is analogous to Claim 9. As explained above, *CAB Catalog* renders these limitations obvious. *See* §VIII.A.3.e.

e. Claim 22: The solar plant of claim 21, wherein, for each cable hanger, the formation structured to support the data carrier is positioned closer to the messenger wire than the cable carrying surfaces.

Claim 22 is analogous to Claim 10. As explained above, *CAB Catalog* renders this limitation obvious. *See* §VIII.A.3.f.

f. Claim 23: The solar plant of claim 14, wherein each cable hanger of the plurality of cable hangers includes a plastisol, PVC coating, and/or a coating having a flame retardant, high dielectric grade, UV inhibited material.

The limitations of Claim 23 are analogous to the combined limitations of Claims 11 and 13. As explained above, *CAB Catalog* discloses these limitations. *See* §VIII.A.3.g, VIII.A.3.i.

X. DISCRETIONARY DENIAL OF INSTITUTION WOULD BE IMPROPER

A. 35 U.S.C. §325(d)

The grounds raised by this Petition are not the same or substantially the same as the art and arguments raised during prosecution. Neither *CAB Catalog* nor *Almy* were considered or cited during prosecution. Therefore, the Examiner did not consider the specific references or combinations of references put forth herein. Accordingly, the Board should not exercise its discretionary power to deny institution of this Petition under §325(d).

B. *Fintiv*

The *Fintiv* framework favors institution of this proceeding. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020).

First: The early stage of the litigation and potential simplification (resulting from the Board invalidating all asserted claims of the ’291 Patent) weighs strongly against the exercise of discretion.

Second: The scheduled trial date is at the end of December, 2025, which is eight months after the Board’s projected deadline for a final written decision in April, 2025, and thus this factor supports institution.

Third: This factor heavily favors institution because investment in the Litigation is limited. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12, 16-17 (PTAB Dec. 1, 2020) (precedential). To date, Petitioner has not filed an

answer to the complaint. The Court has not issued any substantive orders, and there has been no substantive discovery. No depositions have taken place, and none are scheduled. Furthermore, the *Markman* hearing is scheduled for September 2024, nearly a year after the filing of this Petition and long after the Board is expected to issue its institution decision.

Fourth: Although Patent Owner has not yet identified asserted claims in the Litigation, Petitioner challenges several claims of the ’291 Patent that are likely to not be asserted. Thus there will be no overlap with respect to some of the challenged claims. Further, Petitioner hereby stipulates to that if this IPR proceeding is instituted, it will not pursue invalidity in the District Court Case on the same grounds raised in this Petition or any other ground that could have been reasonably raised in this Petition (i.e., any ground that could be raised under §§102 or 103 on the basis of prior art patents or printed publications). This stipulation mitigates concerns about duplicative efforts in the Litigation and this IPR proceeding. *Sotera Wireless, Inc.*, IPR2020-01019, Paper 12, 19 (precedential).

Fifth: This factor favors institution because Petitioner and Defendant in the Litigation are the same party, and Patent Owner CAB is the Plaintiff in the Litigation.

Sixth: Every element of the challenged claims is either expressly shown in the prior art or is obvious in view of well-known art. The strong merits of the grounds presented in this Petition further support institution.

XI. MANDATORY NOTICES

As set forth below and pursuant to 37 C.F.R. §42.8, the following mandatory notices are provided as part of this Petition.

A. Real Party in Interest

Affordable Wire Management, LLC is the real party in interest. Affordable Wire Management, LLC is not controlled by any other entity.

B. Related Matters

The ’291 Patent is asserted against Petitioner in *Cambria County Association for the Blind and Handicapped, Inc. v. Affordable Wire Management, LLC*, No. 1-23-cv-00080 (D. Del.) (the “Litigation”). The Litigation was filed by CAB on January 23, 2023. In the Litigation, CAB also alleges Petitioner infringes U.S. Patent 10,177,551 (the “’551 patent”). On November 3, 2023, Petitioner filed a petition for IPR of the ’551 patent. *See Affordable Wire Management, LLC v. Cambria County Association for the Blind and Handicapped, Inc.*, Case No. IPR2024-00139. Petitioner is not aware of any disclaimers, or reexamination certificates for the ’291 Patent.

C. Lead and Backup Counsel

Petitioner designates the following individuals as its lead counsel and back-up counsel:

Lead Counsel:	**Back-Up Counsel:**
Serge Subach (Reg. No. 74,652) MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C. One Financial Center Boston, Massachusetts 02111 Email: SSubach@mintz.com; CAB_AWM@mintz.com Phone: 617-348-1846 Fax: 617-542-2241	Williams S. Dixon (Reg. No. 78,346) MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C. One Financial Center Boston, MA 02111 Email: WSDixon@mintz.com; CAB_AWM@mintz.com Tel: 617-348-1846 Fax: 617-542-2241

D. Service Information

Please address all correspondence to the lead and backup counsel at the above address.

XII. PAYMENT OF FEES

Pursuant to 37 C.F.R. §§42.103 and 42.15(a), the requisite filing fee of $44,125 (*inter partes* review request fee of $19,000 plus $375 for each claim in excess of 20, and *inter partes* review post-institution fee of $22,500 plus $750 for each claim in excess of 20) for a Petition for *Inter Partes* Review is submitted herewith. Claims 1-23 of the ’291 Patent are being reviewed as part of this Petition. The undersigned further authorizes payment from Deposit Account No. 50-0311 for any additional fees or refund that may be due in connection with the Petition.

XIII. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that *inter partes* review be instituted and that claims 1-23 of the ’291 Patent be found unpatentable.

Dated: November 10, 2023

/*Serge Subach*/

Serge Subach (Reg. No. 74,652)
Williams S. Dixon (Reg. No. 78,346)
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
One Financial Center
Boston, MA 02111
Tel: 617-348-1846
Fax: 617-542-2241
Email: SSubach@mintz.com, WSDixon@mintz.com

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Patent Owner hereby certifies, in reliance on the word count of the word-processing system (Microsoft Office Word 2016) used to prepare this response, that the number of words in this paper is 8,899. This word count excludes the tables of contents, tables of authorities, mandatory notices under 37 C.F.R. §42.8, certificate of word count, certificate of service, appendix of exhibits, and claim listing.

Dated: November 10, 2023

/*Serge Subach*/
Serge Subach (Reg. No. 74,652)

CERTIFICATE OF SERVICE

I certify that copies of the foregoing Petition for *Inter Partes* Review, all referenced exhibits, and the Petitioner's Power of Attorney were served electronically and via FedEx Priority Overnight on the Patent Owner at the correspondence address of record for the '291 Patent as indicated on the USPTO Patent Center:

ECKERT SEAMANS CHERIN & MELLOTT LLC
Attn:
Stephen Bucchianeri
Edward Flynn
Daniel Melman
Theodore McDonough
U.S. Steel Tower
600 Grant Street, 44th Floor
Pittsburgh, PA 15219

Email: SBucchianeri@eckertseamans.com, EFlynn@eckertseamans.com, DMelman@eckertseamans.com, TMcDonough@eckertseamans.com.

Dated: November 10, 2023

/*Serge Subach*/
Serge Subach (Reg. No. 74,652)