



Patent Owner's Oral Argument Presentation

AFFORDABLE WIRE MANAGEMENT, LLC

v.

CAMBRIA COUNTY ASSOCIATION FOR THE BLIND AND
HANDICAPPED, INC.

IPR2024-00178

U.S. Patent No. 11,349,291

Summary of Argument

- Claim construction
 - The Preamble is limiting
 - “Organizing” a plurality of electrical cables extending from a plurality of solar panels means “separating” those cables
- Ground 1 - *Caveney* does not disclose the claimed messenger wire or cable hangers suspended from the messenger wire
- Ground 2 - AWM has not established a motivation to combine *Caveney* and *Almy*
- Ground 3 - AWM has not established a motivation to combine *Carr* and *Almy*
- CAB has presented substantial and unrefuted evidence of secondary considerations of nonobviousness

CLAIM CONSTRUCTION

Claim 1

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hangers 100 that are attached to a messenger wire 12 and carry data wire 38. The hangers 100 are formed of a wire 102 that has been bent in the U-shaped formation to have to have lateral sides 104 and 106, the lateral sides 104 and 106 each have, respectively, upper shoulders 108 and 110. The upper shoulder 108 ends with a spiral gripper 112 with the end of the wire shown at 103. The spiral gripper 112 is shown engaging the messenger wire 12. The upper shoulder 110 of hanger 100 has a locking loop 114 with a data carrier loop 116 formed thereon, the end of the wire on the lateral shoulder side 106 is labeled 101. Hangers 100 are coated with a plastisol coating that has a high flame retardant, high UV resistance, and high dielectric value. Saddles 116, 118 are shown with ends 120 and 122 attached to the lateral sides 104 and 106 of the one hanger 100; cables 130 and 132 are shown as they would be placed and suspended by the hangers 100.

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Shown in FIG. 16 is the alternate hanger 40 shown in a side view. The alternate hanger 40, shows the lateral side 60 with the saddles 46 and 47 attached to the lateral side 60. The saddles 46, 47 have ears 80, 82 formed upon each of the saddles 46 and 47 such that the slot 84 engages the lateral side 60 of the hanger 40 is shown having upper shoulders 50, 52 with the shoulder 52 having a spiral gripper 64 shown thereon and the data carrier loop 58 shown at the end of shoulder 50. Shown in FIG. 17 is a front view of the hanger 40 shown in FIG. 16 with the data carrier loop shown at 58 and spiral gripper shown at 64, saddles 46 and 47 are shown attached to the lateral sides 60 and 62 of the hanger for the U-shaped hanger 40.

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FIG. 17 is a front view of an uncoated, vertically mounted hanger 100 according to the present invention. In FIG. 17 each of the lateral side 60 and 62 is shown being bent inward at 65 so as to add an additional support from the lateral sides 60 and 62 to the bottom of the saddle 46 while the ears 80 and 82 will be crimped around the lateral side 60 and 62 of the U-shaped hanger 40. The additional bands at 65 of the lateral sides 60 and 62 will add support to the carrier 46 when a cable is loaded into the top of saddle 46.

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FIG. 18 is a cross-section taken on the line 18-18 of FIG. 17 of the hanger 40 according to the present invention, shown in FIG. 18 having the ears 80 and 82 engaged with the lateral side 60 and 62 of the hanger 40.

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FIG. 19 is a bottom view of an uncoated, vertically mounted hanger 40 according to the present invention.

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FIG. 20 is a front view of an uncoated, singly mounted hanger 40 according to the present invention. The hanger 40 shown in FIG. 20 has U-shaped lateral sides 60, 62; a single saddle 46 between the lateral side 60, 62; the data carrier loop 58 is shown formed on the upper shoulder 52 with the spiral gripper 64 shown in the upper part of shoulder 50.

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FIGS. 21 and 22 show the bends in the lateral side 60 and 62 that is used to hold the saddle 47, on the lateral sides 60 and 62 is a fragmentary side view showing the crimp in the legs of the hanger 40 according to the present invention that keeps the saddle in place.

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FIG. 22 is a cross-section taken on the line 22-22 of FIG. 21 of the hanger according to the present invention.

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FIG. 23 is a diagrammatic view showing various permutations of vertical and horizontal hangers according to the present invention. As can be seen in FIG. 23 it is within the contemplation of this invention that whether the hangers 10, 40 or 100 are furnished with the spiral gripper and locking hook there are many configurations of vertical and horizontal saddle or carry arrangements that can be utilized with this type of locking hanger. The upper part of FIG. 23 shows that a vertically oriented hanger can have saddle supports of one, two, three or more, that can be attached to a cable messenger wire. The lower part of FIG. 23 shows that the horizontal carrier formations 16 and 17 may be formed using a single carrier formations 16, double carrier formations 16, 17 or a triple or more carrier formation of 1617 and 19. Each of the carrier formations 16, 17 will have a carrier divider 18 formed between each of the carrier formations. Horizontal oriented hangers can have one, two, or three, or more cable carriers.

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FIGS. 24 and 25 are a fragmentary side view of a hanger 40 showing the crimp-locking method of keeping a saddle supported in place according to the present invention. Shown in FIG. 24 is a saddle 47 with the ears 80 and 82 shown crimped around the lateral side 60 of the hanger 40.

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FIG. 25 is a fragmentary cross-section taken on the line 25-25 of FIG. 24 of the hanger 40 according to the present invention.

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FIG. 26 is a side view of a coated, single mount hanger 40 according to the present invention.

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FIG. 27 is a fragmentary cross-section taken on the line 27-27 of FIG. 26 of the hanger according to the present invention.

22
What is claimed is:

23
1. A system for organizing a plurality of electrical cables extending from a plurality of solar panels, the system comprising:

24
a messenger wire structured to be supported a distance above the ground; and

25
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,

26
wherein adjacent cable carrying surfaces of the plurality of cable carrying surfaces are separated by a cable carrier divider.

27
2. The system of claim 1, wherein the plurality of cable carrying surfaces comprises at least three cable carrying surfaces.

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3. The system of claim 1, wherein the plurality of cable carrying surfaces comprises at least four cable carrying surfaces.

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4. The system of claim 1, wherein the plurality of cable carrying surfaces comprises at least five cable carrying surfaces.

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

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

32
a messenger wire structured to be supported a distance above the ground; and

33
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:

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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;

35
outermost lateral spaced apart opposing sides forming the boundary of said hanger;

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1. A system for organizing a plurality of electrical cables
25 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
30 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,
35 wherein adjacent cable carrying surfaces of the plurality of cable carrying surfaces are separated by a cable carrier divider.

(EX1001, 10:24-37)

Essential Structure

- Preamble provides essential structure
 - *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)
- Only the preamble defines the structural limitation of the electrical cables extending from the solar panels
- Preamble provides additional structural limitation of the claimed cable hangers structured to support those electrical cables extending from the solar panels

Paper 31 (POR), 22-23, 24-25; Paper 62 (Sur-Reply), 1-2; EX2038 ¶¶84-87

Antecedent Basis

- Preamble provides antecedent basis for “**the** plurality of electrical cables” in the body of the claims

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

*

*

*

a plurality of cable hangers... 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...

(EX1001, 10:24-34)

Paper 31 (POR), 22-23, 24-25; Paper 62 (Sur-Reply), 1-2

Antecedent Basis

Omid Beik, Ph.D. - July 09, 2024

67

1 that element of the claim, please?

2 A Starting from, a plurality?

3 Q You don't have to read it out loud. I
4 mean just read it to yourself. Starting with, A
5 plurality of cable hangers.

6 A (Deponent complied.)

7 Q Okay. The portion of that element that
8 starts with Each cable carrying surface being
9 structured to -- do you see that?

10 A Yes.

11 Q And it goes on, Each cable carrying
12 surface being structured to support at least one
13 electrical cable of the plurality of electrical
14 cables.

15 Do you see that?

16 A Yes.

17 Q When it refers to the plurality of
18 electrical cables, do you understand that that's
19 referring to the plurality of electrical cables
20 extending from a plurality of solar panels as recited
21 in the preamble of the claim?

22 A Yes.

23 Q Is there anywhere else that you see in the
24 body of the claim the rest of Claim 1 that follows
25 the word "comprising," is there anywhere else in the

- Dr. Beik conceded that “***the*** plurality of electrical cables” is properly understood to refer to the electrical cables extending from the solar panels as recited in the preamble:

17 Q When it refers to the plurality of
18 electrical cables, do you understand that that's
19 referring to the plurality of electrical cables
20 extending from a plurality of solar panels as recited
21 in the preamble of the claim?

22 A Yes.

(EX2004, 67:17-22)

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CAB, EX2004
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Paper 31 (POR), 24-25; Paper 62 (Sur-Reply), 1-2

Prosecution History

Application/Control Number: 17/349,447
Art Unit: 3632

Page 3

Regarding 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). The prior art does not disclose the cable

hangers as comprising a plurality of cable carrying surfaces, each cable carrying surface being structured to support at least one electrical cable of the plurality of cables.

Carr discloses a cable hanger for use in supporting a plurality of conductive cables from a messenger wire. The cable hanger comprises a plurality of cable carrying surfaces (L1 and L2), each cable carrying surface supporting a corresponding conductive cable of the plurality of conductive cables. Adjacent cable carrying surfaces of the plurality of cable carrying surfaces are separated by a cable carrier divider (L3).

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 predictable 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..

Regarding claims 2-4, the prior art disclosed by Applicant in view of Carr discloses two cable carrying surface, but does not disclose three, four, or five carrying surfaces. However, duplication of parts is a matter of design choice. It would have been obvious to one of ordinary skill in the art at the effective filing date of the present

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- Examiner rejected claims as obvious under § 103 over what Examiner misunderstood to be Applicant-disclosed prior art in view of Carr

“Regarding 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).”

(EX1015, 152)

Paper 31 (POR), 11-12, 22-23; Paper 17 (Inst. Dec.), 5

- Allen Smith declaration submitted during prosecution:

“At such time, messenger wire/hanger arrangements ***had never been employed in the solar industry.***”

(EX1015, 201-202)

Paper 31 (POR), 12-13; Paper 17 (Inst. Dec.), 5

3. Beginning in late 2013, CAB began looking into potentially expanding into the solar industry where existing cable management solutions involved either trenching or

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the use of cable trays. At such time, messenger wire/hanger arrangements had never been employed in the solar industry. Accordingly, a great amount of work was required by CAB to develop products that met the particular needs of the industry both from service and safety standpoints as well as to gain acceptance and trust in the industry for such new approach. Such development required testing in order to obtain UL listings, having an expert prepare white papers, have engineering companies write reports on methods of installation, install mockups for owner acceptance and establish actual installations on solar sites to prove the product would perform in actual applications. This process cost hundreds of thousands of dollars and took 2-3 years.

4. I am an inventor of the subject matter claimed in the above-captioned patent application, and I have reviewed in detail, and am thus familiar with, the specification of the above-captioned patent application. I have also reviewed the Examiner's allegation on Page 3 of the Office Action of 12/16/2021 that "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)." Such allegation made by the Examiner is incorrect. While the discussion provided in the BACKGROUND OF THE INVENTION section of the specification (which encompasses pages 2 and 3 of the specification as well as portions of pages 1 and 4) discusses "solar, mining, and electrical industries", the references contained in such section to any use of known/existing cable hanger systems (i.e., systems utilizing a messenger wire and hangers suspended therefrom) or portions thereof (i.e., messenger wire, hanger(s)) were to arrangements and/or components thereof used in the mining and/or electrical (i.e., utility pole to utility pole) industries. Whereas any 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) as none existed at such time. Instead, such references were to CAB's own testing/development which were undertaken non-publicly/confidentially and/or within one year from the filing date of the patent application from which the present application claims priority.

5. Prior to 2014, CAB had no sales in the solar industry. By fiscal year 2020/2021, CAB had sold over 37 million dollars of product to the solar industry. CAB's sales

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Prosecution History

“While the discussion provided in the BACKGROUND OF THE INVENTION section of the specification ... discusses “solar, mining, and electrical industries”, the references contained in such section to any use of **known/existing cable hanger systems (i.e., systems utilizing a messenger wire and hangers suspended therefrom)** or portions thereof (i.e., messenger wire, hanger(s)) were to arrangements and/or components thereof used in the **mining and/or electrical (i.e., utility pole to utility pole) industries.**”

(EX1015, 202)

“Whereas any 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) as none existed at such time. Instead, such references were to CAB's own testing/development which were undertaken non publicly/confidentially and/or within one year from the filing date of the patent application from which the present application claims priority.”

Paper 31 (POR), 12-13; Paper 17 (Inst. Dec.), 5

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the use of cable trays. At such time, messenger wire/hanger arrangements had never been employed in the solar industry. Accordingly, a great amount of work was required by CAB to develop products that met the particular needs of the industry both from service and safety standpoints as well as to gain acceptance and trust in the industry for such new approach. Such development required testing in order to obtain UL listings, having an expert prepare white papers, have engineering companies write reports on methods of installation, install mockups for owner acceptance and establish actual installations on solar sites to prove the product would perform in actual applications. This process cost hundreds of thousands of dollars and took 2-3 years.

4. I am an inventor of the subject matter claimed in the above-captioned patent application, and I have reviewed in detail, and am thus familiar with, the specification of the above-captioned patent application. I have also reviewed the Examiner's allegation on Page 3 of the Office Action of 12/16/2021 that “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).” Such allegation made by the Examiner is incorrect. While the discussion provided in the BACKGROUND OF THE INVENTION section of the specification (which encompasses pages 2 and 3 of the specification as well as portions of pages 1 and 4) discusses “solar, mining, and electrical industries”, the references contained in such section to any use of known/existing cable hanger systems (i.e., systems utilizing a messenger wire and hangers suspended therefrom) or portions thereof (i.e., messenger wire, hanger(s)) were to arrangements and/or components thereof used in the mining and/or electrical (i.e., utility pole to utility pole) industries. Whereas any 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) as none existed at such time. Instead, such references were to CAB's own testing/development which were undertaken non-publicly/confidentially and/or within one year from the filing date of the patent application from which the present application claims priority.

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Prosecution History

- Notice of Allowability: prior art does not disclose or suggest a system for organizing a plurality of electrical cables extending from a plurality of **solar** panels

(EX1015, 210-211)

Paper 31 (POR), 13, 23-24; Paper 17 (Inst. Dec.), 6

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Art Unit: 3632

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DETAILED ACTION

This is the second office action for US Application 17/349,447 for a Locking Cable Hanger and Method of Using.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Allowable Subject Matter

Claims 1-4, 7-18, 20-26 and 28 are allowed. The following is an examiner's 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.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Specification

- “Organizing” must be construed ***in light of the specification***
- Specification afforded greater weight than expansive general dictionary definitions divorced from the intrinsic evidence
 - *Phillips v. AWH Corp.*, 415 F.3d 1303, 1317, 1321-22 (Fed. Cir. 2005)

Paper 62 (Sur-Reply), 2

Specification

“Prior to 2014, AC and DC cables could be bundled immediately adjacent to, and touching, one another in a wire management system for the solar panels. In the new National Electric Code of 2014, the AC and DC cables must not be immediately adjacent to one another, but *must have a degree of separation from one another. Power carrying cables have a tendency to induce errors or interfere with the signal wires that are located in close proximity to them.*”

(EX1001, 1:32-39)

Paper 31 (POR), 26; Paper 62 (Sur-Reply), 2

1
LOCKING CABLE HANGER AND METHOD
OF USING

CROSS REFERENCE TO RELATED
APPLICATION

This application is a continuation application of and claims priority to U.S. patent application Ser. No. 17/199,992, filed Mar. 12, 2021, which claims priority to U.S. patent application Ser. No. 15/662,474, filed Jul. 28, 2017, now U.S. Pat. No. 10,978,861, issued Apr. 13, 2021, which claims priority to U.S. patent application Ser. No. 14/556,117, filed Nov. 29, 2014, now U.S. Pat. No. 9,722,405, issued Aug. 1, 2017.

BACKGROUND OF THE INVENTION

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. Such cables are usually supported by a messenger wire that are themselves independently structurally supported and strung along the planned cable route. In solar plants, direct current wires attach first to the solar panels and then run to combiner boxes before extending further to power inverters. In addition, alternating current power cables are used to power the motors that control the trackers, devices that rotate the solar panels to follow the sun in order to obtain maximum power during daylight hours.

Prior to 2014, AC and DC cables could be bundled immediately adjacent to, and touching, one another in a wire management system for the solar panels. In the new National Electric Code of 2014, the AC and DC cables must not be immediately adjacent to one another, but must have a degree of separation from one another. Power carrying cables have a tendency to induce errors or interfere with the signal wires that are located in close proximity to them. This new requirement also applies to other applications outside the solar power industry, such as the mining and electrical industries.

Because of the increased use of trackers in solar power plants, there is increased use of category five cables and other data wiring. This type of control wiring is used to give power plant operators feedback from the solar power plant array on what angles the panels are stationed, and what the proper angle should be to maximize power output from the sun. This data and information is constantly monitored to obtain maximum power output from the thousands of solar panels in the solar power plant. The type of wiring used in collecting data is sensitive to cables used for AC and DC power and because of that sensitivity, data wiring cannot be bundled with power cables and must be supported by a separate carrier that is at least one inch away from all power cables.

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.

The cable hanger has a unique locking arm attachment section which has a closed loop spiral for a secure lock on the messenger wire. In the past, hangers had open loops or modified open loops on the top attachment section which could easily fall off if the hanger were bumped or hit during the wire loading process. In a solar plant there is a recent move to tracker systems which utilize more wiring than previously fixed in place systems. 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. This process continues until all individual cables and bundles of cables are supported in the hangers. In the process of loading cables, the hangers are constantly bumped and jostled as they are loaded with bundles of cables. All styles of hangers presently on the market can easily fall off the messenger wire because they are only hanging by one open loop, and they can fall off when bumped during cable installation. Cambria County's Association for The Blind And Handicapped ("CAB") is a new and improved captive locking arm designed to securely grip the messenger wire so the cable hangers stay in position during the entire loading process and will not fall off when bumped or knocked. After all cables are loaded, the other top attachment end of the cable hanger is then squeezed and locked on the messenger wire.

The new NEC code requires any cable support system to have supports that are spaced at no greater than twelve-inch intervals. This applies to cable trays, hangers or all other types of cable support systems. The old-style hangers with their open style loops can fall off easily during installation and also easily slide out of their twelve-inch spacing when loading the cables. This is a more serious problem when you consider that there are tens of thousands of hangers being installed in the desert heat which can reach 120 degree F. Any wasted labor is a high additional cost in this environment. The new unique captive closed loop locking arm on CAB's cable hangers securely retains the hanger in place even when bumped or knocked around during the cable installation process. This improved captive engagement will also keep cable hangers securely in position on the twelve-inch centers and eliminate the need to reposition hangers on twelve-inch centers after all cables have been loaded into the carriers of the hangers.

A major factor affecting labor costs during installation of cables is how easily the electrician can load the cables and bundles of cables in the hangers in the stifling heat of the desert where solar power plants are usually located. All styles of cable hangers presently on the market will easily swing from side to side as they are initially suspended on the messenger wire. This means an electrician must take one hand and properly align the hanger in a 90 degree perpendicular orientation to the messenger wire in order to load the cables or bundles of cables in the hanger with the other hand. This two handed process of aligning the hanger increases the time necessary to load cables over the thousands of feet of messenger wire with the hangers on twelve-inch centers. The newly designed captive top locking arm of the CAB cable hanger addresses this problem by always maintaining the hanger at a 90 degree orientation to the messenger wire on initial installation. The newly designed top locking arm totally eliminates any lengthwise swinging or traveling movement from side to side and allows the electrician to use both hands for the loading of cables and cable bundles. The new design feature will save many hours of labor in the field.

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Specification

“This data and information is constantly monitored to obtain maximum power output from the thousands of solar panels in the solar power plant. *The type of wiring used in collecting data is sensitive to cables used for AC and DC power and because of that sensitivity, data wiring cannot be bundled with power cables and must be supported by a separate carrier that is at least one inch away from all power cables.*”

(EX1001, 1:49-56)

Paper 31 (POR), 26; Paper 62 (Sur-Reply), 2

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1
LOCKING CABLE HANGER AND METHOD
OF USING

CROSS REFERENCE TO RELATED
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This application is a continuation application of and claims priority to U.S. patent application Ser. No. 17/199,992, filed Mar. 12, 2021, which claims priority to U.S. patent application Ser. No. 15/662,474, filed Jul. 28, 2017, now U.S. Pat. No. 10,978,861, issued Apr. 13, 2021, which claims priority to U.S. patent application Ser. No. 14/556,117, filed Nov. 29, 2014, now U.S. Pat. No. 9,722,405, issued Aug. 1, 2017.

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Prior to 2014, AC and DC cables could be bundled immediately adjacent to, and touching, one another in a wire management system for the solar panels. In the new National Electric Code of 2014, the AC and DC cables must not be immediately adjacent to one another, but must have a degree of separation from one another. Power carrying cables have a tendency to induce errors or interfere with the signal wires that are located in close proximity to them. This new requirement also applies to other applications outside the solar power industry, such as the mining and electrical industries.

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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.

The cable hanger has a unique locking arm attachment section which has a closed loop spiral for a secure lock on the messenger wire. In the past, hangers had open loops or modified open loops on the top attachment section which could easily fall off if the hanger were bumped or hit during the wire loading process. In a solar plant there is a recent move to tracker systems which utilize more wiring than previously fixed in place systems. 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. This process continues until all individual cables and bundles of cables are supported in the hangers. In the process of loading cables, the hangers are constantly bumped and jostled as they are loaded with bundles of cables. All styles of hangers presently on the market can easily fall off the messenger wire because they are only hanging by one open loop, and they can fall off when bumped during cable installation. Cambria County's Association for The Blind And Handicapped ("CAB") is a new and improved captive locking arm designed to securely grip the messenger wire so the cable hangers stay in position during the entire loading process and will not fall off when bumped or knocked. After all cables are loaded, the other top attachment end of the cable hanger is then squeezed and locked on the messenger wire.

The new NEC code requires any cable support system to have supports that are spaced at no greater than twelve-inch intervals. This applies to cable trays, hangers or all other types of cable support systems. The old-style hangers with their open style loops can fall off easily during installation and also easily slide out of their twelve-inch spacing when loading the cables. This is a more serious problem when you consider that there are tens of thousands of hangers being installed in the desert heat which can reach 120 degree F. Any wasted labor is a high additional cost in this environment. The new unique captive closed loop locking arm on CAB's cable hangers securely retains the hanger in place even when bumped or knocked around during the cable installation process. This improved captive engagement will also keep cable hangers securely in position on the twelve-inch centers and eliminate the need to reposition hangers on twelve-inch centers after all cables have been loaded into the carriers of the hangers.

A major factor affecting labor costs during installation of cables is how easily the electrician can load the cables and bundles of cables in the hangers in the stifling heat of the desert where solar power plants are usually located. All styles of cable hangers presently on the market will easily swing from side to side as they are initially suspended on the messenger wire. This means an electrician must take one hand and properly align the hanger in a 90 degree perpendicular orientation to the messenger wire in order to load the cables or bundles of cables in the hanger with the other hand. This two handed process of aligning the hanger increases the time necessary to load cables over the thousands of feet of messenger wire with the hangers on twelve-inch centers. The newly designed captive top locking arm of the CAB cable hanger addresses this problem by always maintaining the hanger at a 90 degree orientation to the messenger wire on initial installation. The newly designed top locking arm totally eliminates any lengthwise swinging or traveling movement from side to side and allows the electrician to use both hands for the loading of cables and cable bundles. The new design feature will save many hours of labor in the field.

Affordable Wire Management, Exhibit No. EX1001

2

POSITA’s Understanding - Expert Testimony

- Dr. Kern’s testimony:
 - As understood by a POSITA, in light of claim language and specification, “organizing a plurality of electrical cables extending from a plurality of solar panels,” means **separating** those electrical cables (*EX2038, ¶88*)
 - Organization begins with **separating** things into groups (*EX1047, 107:14-15*)

Paper 31 (POR), 25, 27; Paper 62 (Sur-Reply), 2-3

POSITA’s Understanding - Expert Testimony

- Dr. Beik’s testimony:
 - National codes/standards require cables to be ***spaced apart*** to avoid cross-linking (*EX1002*, ¶32)
 - Cable management, supporting cables, ***separating*** cables, is what the patent is about (*EX2004*, 62:2-4)
 - Organizing a plurality of electrical cables extending from a plurality of solar panels, as recited in Claim 1, is referring to ***separating*** DC and AC cables from data cables (*EX2004*, 86:3-14)

Paper 31 (POR), 25, 27; Paper 62 (Sur-Reply), 2-3

AWM’s Asserted Motivation to Modify/Combine

- AWM’s motivation to modify/combine arguments premised on separation of electrical cables to prevent cross-induction
 - Ground 1: POSITA would have been motivated to **separate** current-carrying cables from data carrier cables to prevent interference (*Paper 1 (Pet.)*, 34-36)
 - Ground 2: POSITA would have been motivated to **replace** Almy’s wire loops with Caveney’s hangers to prevent cross-linking (*Paper 1 (Pet.)*, 38)
 - Ground 3: POSITA would have been motivated to **replace** Almy’s wire loops with Carr’s hanger to prevent cross-induction (*Paper 1 (Pet.)*, 46-47)

Paper 62 (Sur-Reply), 3

GROUND 1: *CAVENEY*

Caveney Does Not Disclose a Messenger Wire

- Structures disclosed by *Caveney* do not disclose a messenger wire
- *Caveney* structures are all pre-existing building structures (*EX2038*, ¶¶97, 118, 126; *Paper 17 (Inst. Dec.)*, 15, 18)
 - “FIG. 1 shows two multi-tiered cable support systems 30 secured to a fastener, such as I-beam clamp bracket 34. The I-beam clamp bracket 34 is attached to a **structure, such as I-beam** 36. As shown in FIG. 20, cable support system 30 may be attached directly to a **structure, such as ladder rack** 38. However, it is likewise contemplated that cable support system 30 may be secured directly to any **fastener or structure, including but not limited to a threaded rod, a screw-on beam clamp bracket, a hammer-on beam clamp bracket, a C-purlin bracket, a Z-purlin bracket, a drop wire bracket, a floor support post bracket, a ladder rack bracket, a joist, a ceiling or a wall.**” (*EX1003*, 2:65-3:9)

Paper 31 (POR), 27-30; *Paper 62 (Sur-Reply)*, 3-4

Caveney Does Not Disclose a Messenger Wire

Caveney purported to improve over *Laughlin* cable hangers

- “However, none of the prior cable support systems provide the ability to add additional cable support members to the cable support system after the initial installation is complete. For example, Erico's CableCat™, as shown and described in U.S. **Pat. No. 5,740,994 [Laughlin]**, utilizes two four saddle support assemblies shown at 170 and 171 formed on the brackets 150.” (EX1003, 1:11-16) (Caveney)
- “It would also be desirable to provide an **efficient cable support system that utilizes current cable support member capacity**, while providing the ability to increase capacity after initial installation.” (EX1003, 1:33-36) (Caveney)

[57]

ABSTRACT

A cable support for category 5 cable, fiber optic cable, and the like is in the form of a curved smooth saddle to support the cable in lay-in fashion. The saddle has a projecting stem with a number of fastening accommodations to receive all kinds of clamps, clips or brackets, so that one or more supports may be positioned on or suspended from anything or any surface in the **utilitarian part of a building such as the area above a drop ceiling**. This enables the supports to be positioned within about 120–150 cm of each other so that cable sag between support saddles does not exceed 30 cm.

(EX2002, Abstract) (Laughlin)

Paper 31 (POR), 29-30

Caveney's Hangers not Structured to be Suspended from Messenger Wire

- Dr. Beik's Declaration: *Caveney's* cable hanger could attach to a messenger wire just like a threaded rod because both “structures” have a circular cross-section (*EX1002*, ¶¶59-60; *Paper 1 (Pet.)*, 25-26)
- Dr. Kern's Declaration: threaded rod is a “fastener”, not “structure” (*EX2038*, ¶¶121-122)
- Board agreed with Dr. Kern (*Paper 17 (Inst. Dec.)*, 16)
- Dr. Beik Deposition: conceded that the threaded rod disclosed in *Caveney* is a “fastener” not “structure” (*EX2004*, 116:19-117:8)

Paper 31 (POR), 30-31; *Paper 62 (Sur-Reply)*, 4-5, n.1

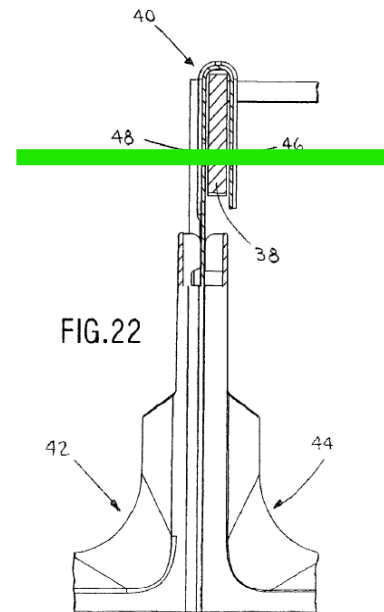
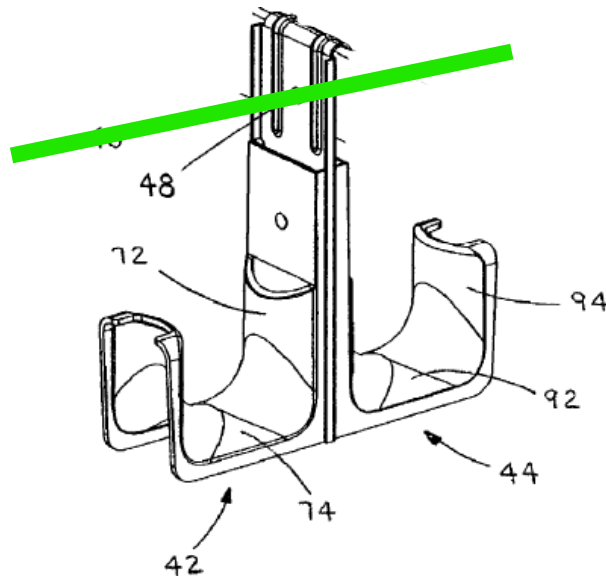
Caveney's Hangers not Structured to be Suspended from Messenger Wire

- AWM/Dr. Beik offered three new modifications:
 - Eliminate ladder rack and extend messenger wire through apertures 46 and 48 of *Caveney's* hanger (*EX2004*, 117:9-20, 119:15-22; *Paper 54 (Reply)*, 7)
 - Hang hook of *Caveney's* hanger over messenger wire without threaded rod (*Paper 54 (Reply)*, 7-8)
 - Hang hook of *Caveney's* hanger from a messenger wire and extend threaded rod through apertures 46 and 48 to secure hanger (*EX2004*, 119:18-22, 121:17-25; *Paper 54 (Reply)*, 9-10)

Paper 31 (POR), 30-32; *Paper 62 (Sur-Reply)*, 4

Caveney's Hangers not Structured to be Suspended from Messenger Wire

- (1) Extending messenger wire through apertures 46 and 48 (*Paper 54 (Reply)*, 7 (*figure not shown in Reply*))

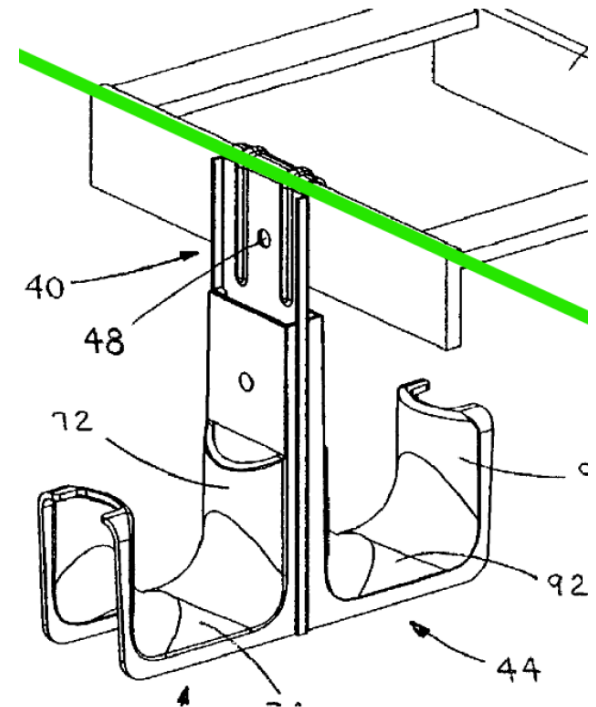
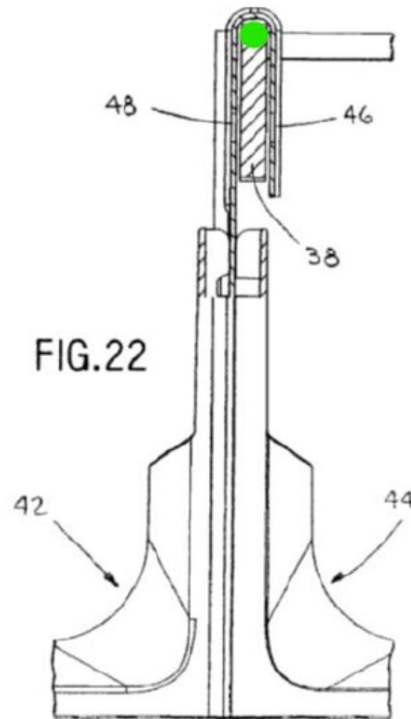
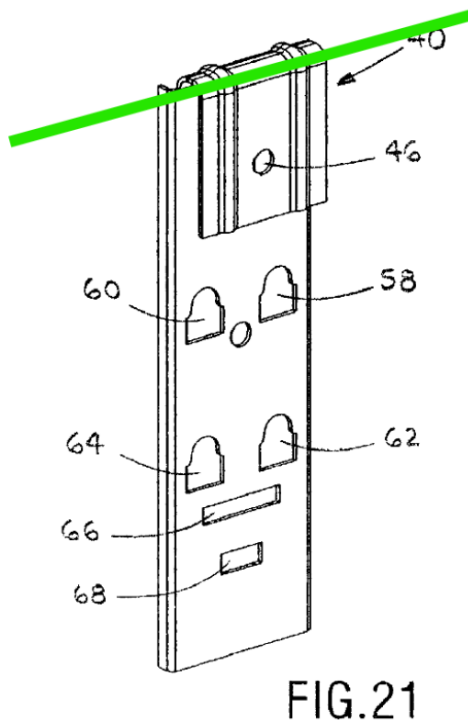


(EX1003, Figures 20 and 22, annotated by Patent Owner)

Paper 31 (POR), 31-33; *Paper 62 (Sur-Reply)*, 4-5

Caveney's Hangers not Structured to be Suspended from Messenger Wire

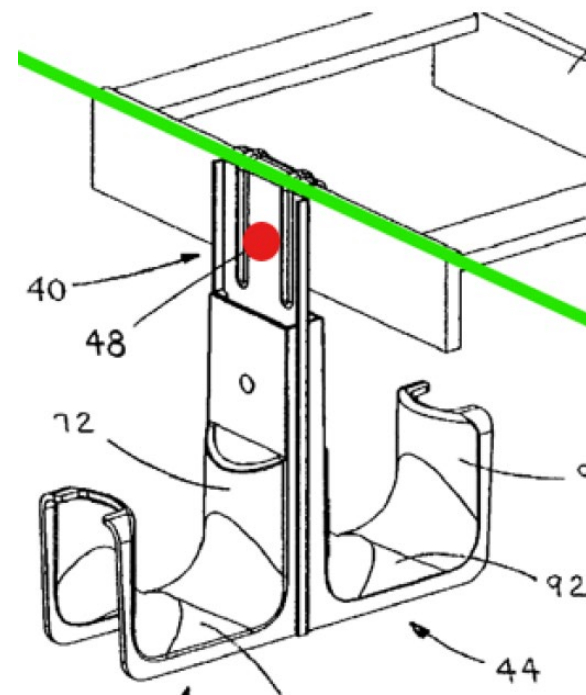
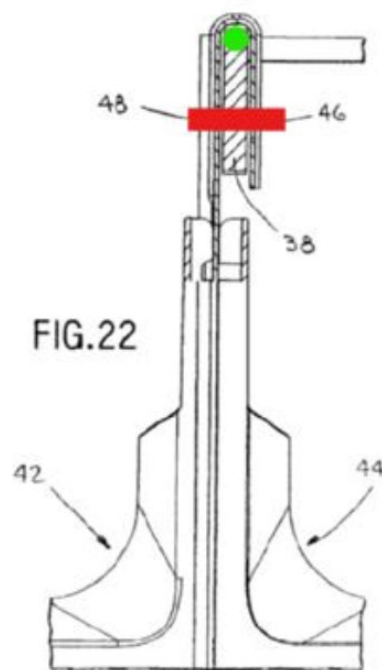
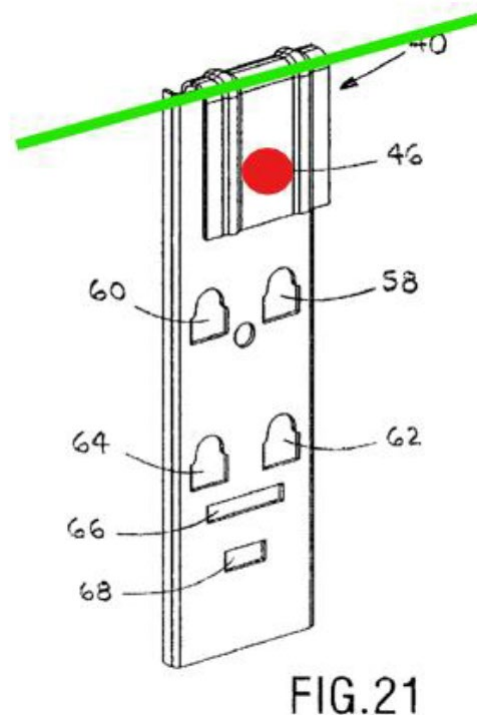
(2) Hang hook of hanger over messenger wire without threaded rod
(*Paper 54 (Reply)*, 8)



Paper 31 (POR), 31-33; *Paper 62 (Sur-Reply)*, 4-5

Caveney's Hangers not Structured to be Suspended from Messenger Wire

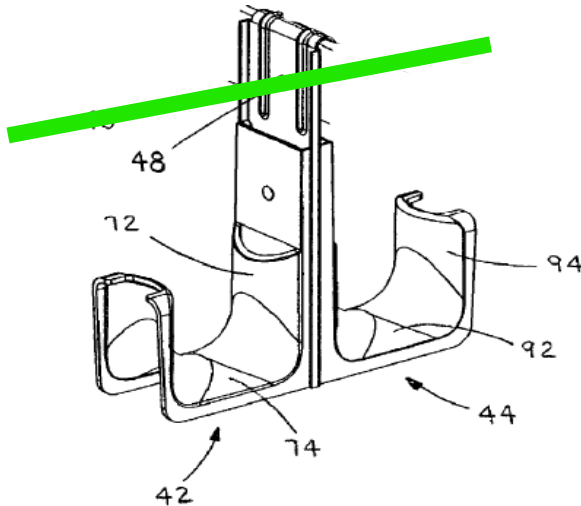
(3) Hang hook of hanger over messenger wire with threaded rod extended through apertures 46 and 48 (*Paper 54 (Reply)*, 9-10)



Paper 31 (POR), 31-33; *Paper 62 (Sur-Reply)*, 4-5

Caveney's Hangers not Structured to be Suspended from Messenger Wire

- AWM articulates no explanation with rational underpinnings to support such modifications
- AWM fails to demonstrate reasonable expectation of success
 - E.g., extending messenger wire through apertures 46 and 48 in alternative 1



Standard System



Paper 31 (POR), 31-34

(EX2041, 2)

Caveney's Hangers not Structured to be Suspended from Messenger Wire

- Classic impermissible hindsight – AWM uses claims as “roadmap to reconstruct the claimed invention using disparate elements from the prior art” (*TQ Delta LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1360 (Fed. Cir. 2019))
- Would undermine *Caveney's* objective of supporting cable hangers in a more efficient and less expensive manner using already existing building structures (*EX1003*, 1:27-36; *EX2038*, ¶126)

Paper 31 (POR), 33-34 ; *Paper 62 (Sur-Reply)*, 5

GROUND 2 and 3:

CAVENEY and *ALMY* (Claims 14-18, 21-22)
CARR and *ALMY* (Claims 1-10, 14-22, 24-25)

Caveney's Hangers not Structured to be Suspended from Messenger Wire

- *Caveney's* hangers are structured to be attached to pre-existing building structures, not a messenger wire (*EX2038*, ¶¶97, 118, 126; *EX1047*, 118:11-119:14; *Paper 17 (Inst. Dec.)*, 15, 18)
- No motivation to modify *Caveney's* cable hangers to be suspended from and disposed along any messenger wire, or to replace *Almy's* wire loops with *Caveney's* hangers (*Paper 17 (Inst. Dec.)*, 26, 27, 28)
- No reasonable expectation of success

Paper 31 (POR), 32-34, 35-36; *Paper 62 (Sur-Reply)*, 5-7

AWM's Asserted Motivation to Combine was to Prevent Cross-Induction

- AWM and Dr. Beik argued that the motivation to combine for both the *Caveney/Almy* and *Carr/Almy* combinations was ***to prevent cross-induction***
- Petition:
 - POSITA would have been motivated to ***replace Almy's wire loops with Caveney's hangers to prevent cross-linking*** (*Paper 1 (Pet.)*, 38)
 - POSITA would have been motivated to ***replace Almy's wire loops with Carr's hanger to prevent cross-induction*** (*Paper 1 (Pet.)*, 46-47)

Paper 31(POR), 35, 36-37, 39; *Paper 62 (Sur-Reply)*, 5-7, 7-8

AWM's Asserted Motivation to Combine was to Prevent Cross-Induction

- Dr. Beik's Testimony:
 - *Almy's* wire loops unable to provide required distance between sets of cables **to prevent cross-linking** (EX1002, ¶¶78, 98)
 - POSITA would have been motivated to replace *Almy's* wire loops with *Caveney's* multi-tiered hangers **to minimize cross-induction** (EX1002, ¶79)
 - POSITA would have been motivated to replace *Almy's* wire loops with *Carr's* multi-surface hangers **to minimize cross-induction** (EX1002, ¶99)
 - POSITA would have been motivated to combine *Carr and Almy* to replace *Almy's* wire loops with *Carr's* hanger **to prevent cross-induction effect** (EX2004, 155:20-156:20)

Paper 31(POR), 35, 36-37, 39; Paper 62 (Sur-Reply), 7-8

AWM's Asserted Motivation to Combine was to Prevent Cross-Induction

- Board's Institution Decision:
 - “Petitioner asserts that a skilled artisan would have been ***motivated to replace Almy's wire loops with Caveney's cable hangers because Caveney's cable support system... would prevent cross-linking*** by separating data and current-carrying cables in *Almy*.” (*Paper 17 (Inst. Dec.)*, 25)
 - “We find on this record, Petitioner has shown sufficiently that a skilled artisan would have combined *Carr* and *Almy* to replace *Almy*'s wire loops with *Carr*'s hangers to provide a simple, cheap construction that separates electrical cables and ***prevents the cross-induction effect between conductors... as Carr teaches***.” (*Paper 17 (Inst. Dec.)*, 31)

Paper 31(POR), 35, 36-37, 39-40; *Paper 62 (Sur-Reply)*, 5-6, 7-8

No Motivation to Combine to Prevent Cross-Induction

- POSITA would not have been motivated to combine either *Caveney* with *Almy* or *Carr* with *Almy* to prevent cross-induction
- Dr. Kern: *Almy* only discloses DC cables (*EX2038*, ¶¶153-163)
- Dr. Beik: points to no disclosure in *Almy* of AC or data cables (e.g., *EX2004*, 148:9-149:16, 151:4-22)
- Dr. Beik did not dispute Dr. Kern's testimony that there is no cross-induction between only DC cables (*EX2038*, ¶¶153-154, 163; *EX2004*, 153:22-154:16)

Paper 31 (POR), 36-46; *Paper 62 (Sur-Reply)*, 7, 8

AWM's New Arguments in Reply

- AWM's new arguments (without expert support): motivation to combine based on ***increased use of trackers*** and ***changes to 2014 NEC***
 - No explanation how increased use of trackers provides motivation for either combination
 - No evidentiary support for AWM's misstatement that NEC "counseled" POSITAs to use hanger-based systems to suspend conductors in solar installations
(Paper 54 (Reply), 10-13)

Paper 62 (Sur-Reply), 5-10

AWM's New Arguments in Reply

- AWM simply recites the problem already identified and addressed in the '291 Patent
 - “[K]nowledge of a problem and motivation to solve it are entirely different from motivation to combine ***particular references***” to reach the claimed invention (*Innogenetics, N.V. v. Abbott Laboratories*, 512 F.3d 1363, 1373 (Fed. Cir. 2008))
- Classic impermissible hindsight (*TQ Delta*, 942 F.3d at 1361)

Paper 62 (Sur-Reply), 5-10

No Motivation to Combine to Provide More Robust Hanger

- Institution Decision relied on Dr. Beik's testimony that combination of *Carr* and *Almy* would provide “**more robust hanger**” that would overcome recognized disadvantages of wire loops (*Paper 17 (Inst. Dec.)*, 32 (citing *EX1002*, ¶98))
- Dr. Beik incorrectly equated wire loops with zip ties and cable ties
 - “A POSITA would have recognized the disadvantages of using wire loops to suspend conductors from a messenger wire. Bundling cables with **zip-ties, cable-ties, or other lashings such as wire loops** provide temporary solutions but cannot be used permanently in power systems.”

(*EX1002*, ¶98)

Paper 31 (POR), 46-48; *Paper 62 (Sur-Reply)*, 9-10

No Motivation to Combine to Provide More Robust Hanger

- *Almy*: wire loops are an ***improvement*** over wire ties and cable ties (*EX1004*, [0015])
- AWM and Dr. Beik provide no support for proposition that *Carr*'s hangers would be more robust than *Almy*'s wire loops
- In contrast, CAB has provided support that *Almy*'s wire loops (that support a bundle of heavier DC cables) would be more robust than *Carr*'s hangers (that support a pair of lightweight telecom cables) (*EX2038*, ¶172)

Paper 31 (POR), 46-48

No Motivation to Combine to Provide More Robust Hanger

- *Carr* compares its hangers made of laminated steel to hangers punched from thin metallic sheets that are ***prior art to Carr*** (EX1005, 1:4-19)
- *Carr* discloses nothing that compares the strength of its hangers to *Almy*'s wire loops
- ***AWM offers no explanation with rational underpinnings as to why a POSITA would change the dimensions of Carr's hangers to make them strong enough to support Almy's DC cables***

Paper 62 (Sur-Reply), 9-10

Secondary Considerations

Objective Indicia of Nonobviousness

- “The objective indicia analysis is, therefore, a ***fundamental part of the overall § 103 obviousness inquiry***” and ***must be considered***
- It is well-established that objective evidence are “essential safeguards that ***protect against hindsight bias***,”
- Objective evidence “may often be the ***most probative and cogent evidence of nonobviousness***.”

(Liqwd, Inc. v. L’Oreal USA, Inc., 941 F.3d 1133, 1136-37 (Fed. Cir. 2019))

Paper 31 (POR), 48-50; Paper 62 (Sur-Reply), 10-11

Objective Indicia of Nonobviousness

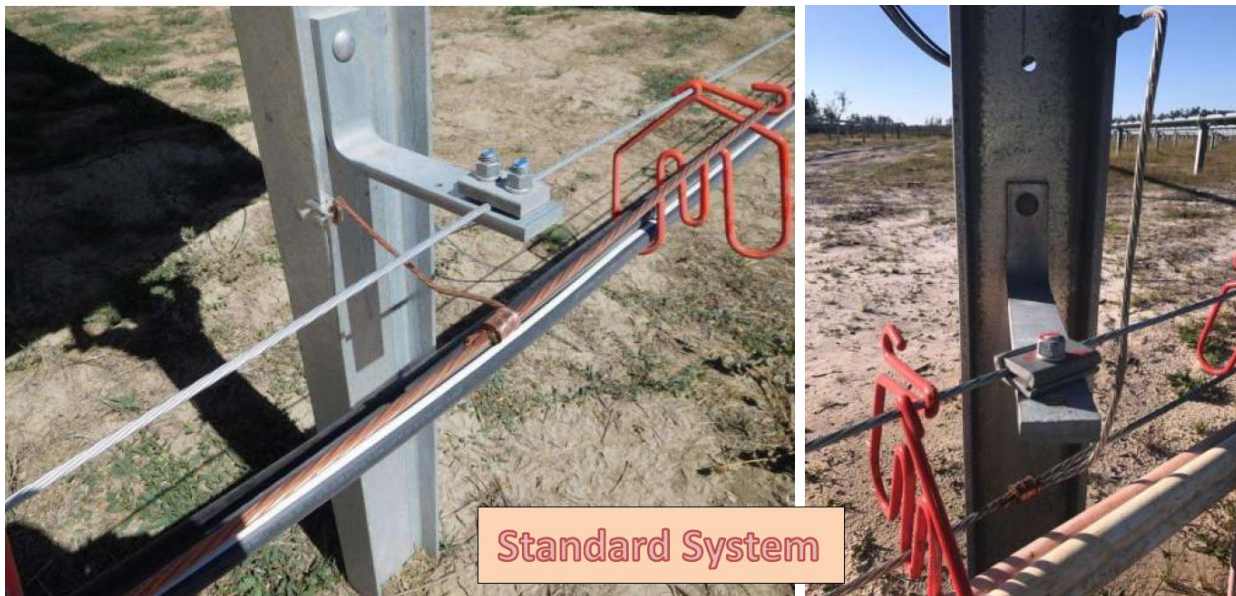
- Dr. Beik testified he was not aware of any evidence of secondary considerations
- “Even if evidence of secondary considerations existed, in my opinion, it would be insufficient to overcome the clear obviousness of the challenged claims”

(EX1002, ¶173)

Paper 62 (Sur-Reply), 11

CAB is Entitled to a Presumption of Nexus

- Presumption of nexus appropriate because CAB's Standard System embodies the claimed features of the '291 Patent and is coextensive with it
 - *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019)



(EX2041, 2)

Paper 31 (POR), 48-50; Paper 62 (Sur-Reply), 12-15

CAB is Entitled to a Presumption of Nexus

- CAB has presented ample evidence identifying parts that comprise the Standard System (*EX2038*, ¶¶181, 188, A3, A4, A6, A9, A10; *EX2058*, ¶¶2-8; *EX2046*; *EX2056*)
- Dr. Kern:
 - Established that CAB's Standard System embodies the claimed features and is coextensive with them (*EX2038*, ¶182)
 - Specifically described the Standard System's multi-carrier cable hangers and analyzed CAB's Standard System as shown in CAB's installation guide (*EX2038*, ¶188-196, A1-A14)

Paper 31 (POR), 50; Paper 62 (Sur-Reply), 13-15

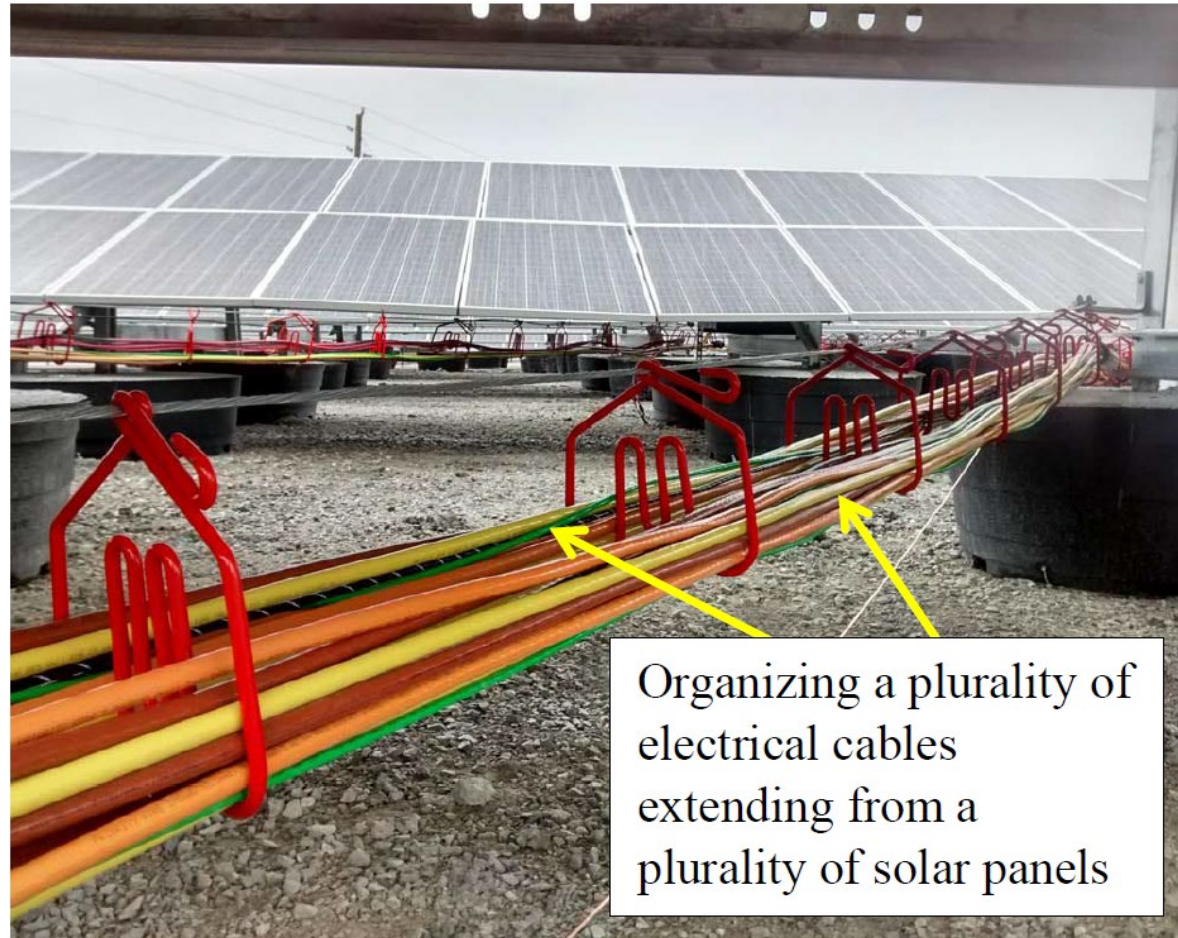
CAB is Entitled to a Presumption of Nexus

- Only necessary for Dr. Kern to have confirmed that CAB's Standard System is comprised of a messenger wire and multi-carrier cable hangers, suspended from and disposed along a messenger wire, and structured to support electrical cables extending from solar panels
- Dr. Kern sufficiently identifies exemplary components of the Standard System as shown in CAB's installation guide (*EX2041*)
- Not necessary to identify every other alternative component that could be used in CAB's Standard System
- Not necessary to prepare claim charts for each one of hundreds of combinations of dozens of components

Paper 62 (Sur-Reply), 12-13

CAB is Entitled to a Presumption of Nexus

- Cable hangers structured to support plurality of electrical cables extending from plurality of solar panels (*EX2038, A2*)



Paper 62 (Sur-Reply), 15

CAB is Entitled to a Presumption of Nexus

- Standard System's mid-pier kits and end-pier kits are not unclaimed **critical** features
 - Not **critical** to the functionality of the Standard System
 - No suggestion that these components are patented features under any other patent
- Dr. Kern has provided unrebutted testimony that mid-pier kits and end-pier kits are a **convenience** and **one means** of suspending the messenger wire above the ground (*EX1047, 182:20-184:1*)
- Mr. Smith made clear that grounding jumpers are not components of the Standard System (*EX2006, ¶16; EX1028, 100:10-18*)

Paper 62 (Sur-Reply), 14-15

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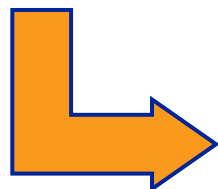
- Evidence of copying is always relevant and is **strong evidence of nonobviousness**
 - *Liqwd Inc.*, 941 F.3d at 1138; *Volvo Penta of the Americas, LLC v. Brunswick Corp.*, 81 F.4th 1202, 1213 (Fed. Cir. 2023)
- “Indeed, we have found that ‘[o]bjective considerations such as failure by others to solve the problem and **copying may often be the most probative and cogent evidence of nonobviousness.**’”
 - *Volvo Penta of the Americas*, 81 F.4th at 1213

Paper 31 (POR), 51-54; Paper 62 (Sur-Reply), 16-18

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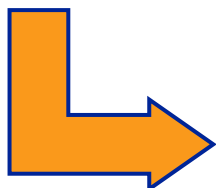
March 19,
2015

CAB provides samples of cable hangers (including two-carrier) and engineering drawings to First Solar under NDA (*EX2006*, ¶49; *EX2014*)



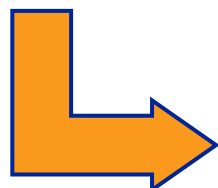
April 9,
2015

First Solar engineering drawing of two-carrier hanger (DRS) (*EX2013*)



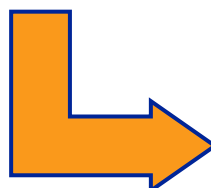
September
15, 2015

CAB receives bid request from SW Fastener on behalf of First Solar for 2 million hangers, attaching DRS engineering drawing of two-carrier hanger (*EX2013*)



September
21, 2015

CAB calls out First Solar regarding bid request that included drawing of CAB's two-carrier hanger (*EX2014*)

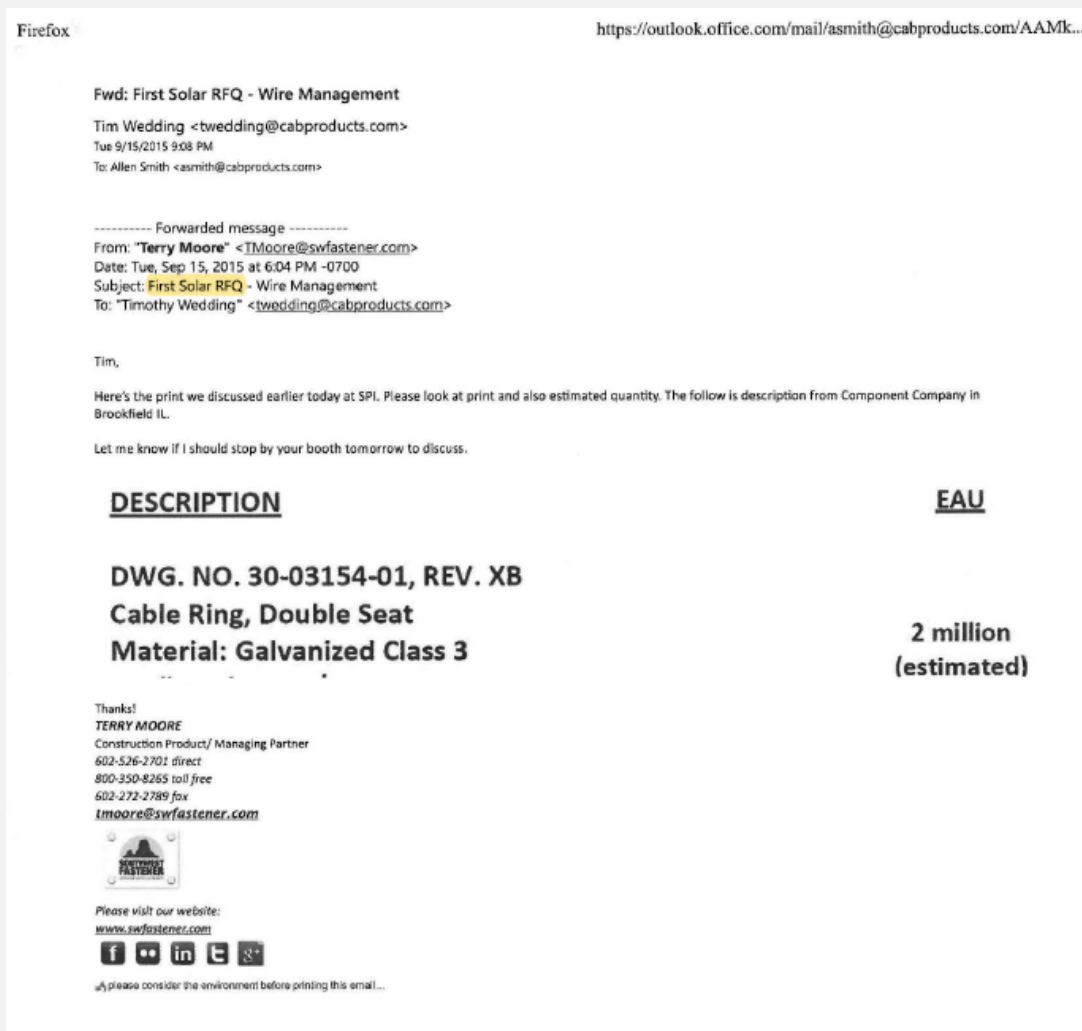


October 2,
2015

CAB again contacts First Solar regarding bid request for CAB's confidential and proprietary two-carrier hanger (*EX2015*)

Paper 31 (POR), 51-54; Paper 62 (Sur-Reply), 16-18

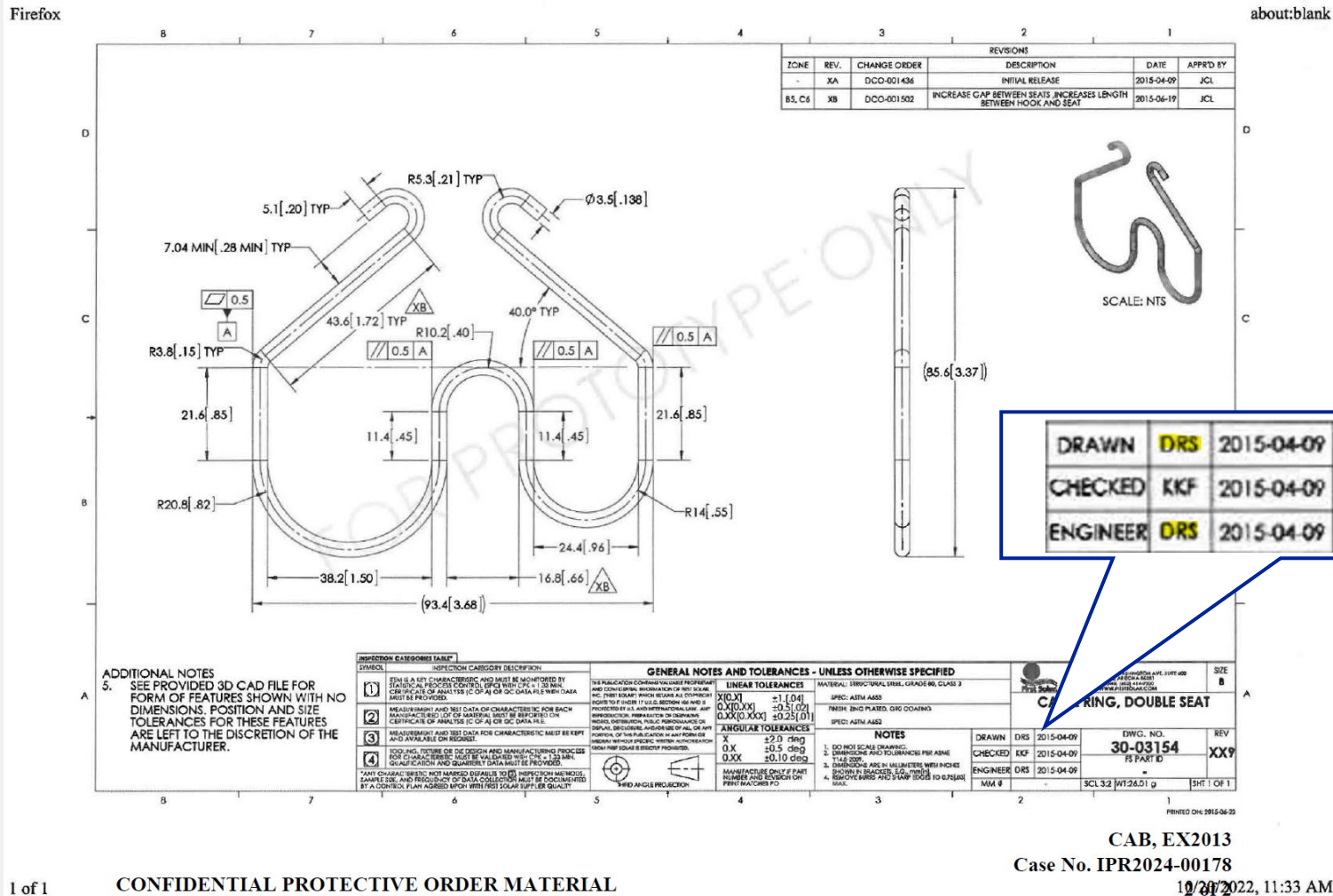
Copying – September 15, 2015



(EX2013)

Paper 31 (POR), 51-54; Paper 62 (Sur-Reply), 16-18

Copying – September 15, 2015



*First Solar
Copied
Hanger*

(EX2013)

Copying – September 21, 2015

Firefox

<https://outlook.office.com/mail/asmith@cabproducts.com/AAMk...>

FW: CAB Cable Management Product Line

Allen Smith <asmith@cabproducts.com>

Mon 9/21/2015 3:46 PM

To: smurphy@firstsolar.com <smurphy@firstsolar.com>

Cc: Tim Wedding <twedding@cabproducts.com>

Steve,

Good afternoon. Thanks for taking the time to talk with me this morning. I have outlined below some general information on the circumstances regarding the attached hanger drawing.

Below this e-mail, I have included our first correspondence from Jeff Lamb which led to a conference call with him, another engineer, Daniel Smith, CAB solar specialist, Tim Wedding, and myself on March 12, 2015. Prior to this in late 2014 and early 2015, we had been in contact with Mark McIntyre and Eddie Bugg with general information in the form of electronic media about our cable management system.

On March 16, 2015 we executed an NDA and returned it to Jeff Lamb at his request. On March 19th Tim Wedding and I met with Jeff Lamb, Dan Smith, and a team of engineers from your quality assurance team, including Jeffery Niehaus, at the lab in Mesa, 7931 E. Pecos Rd., Bldg 5, Suite 186 Mesa, AZ 85212.

At the meeting we brought over a dozen samples of our CAB wire management products and went over designs and features that we would have available. All of the the hanger designs that we brought to this meeting were proprietary designs for which we are seeking patent protection which was disclosed under the NDA. Jeff took us to the mock up area where we reviewed specific product details and the best way to integrate a wire management system into your support structure. Following the mock up Mr. Lamb reviewed pricing and quantity requirements.

As a follow up to our meeting during the week of March 30th, we sent Jeff additional samples for a larger scale mock up. These samples were made from class 3 galvanized wire in bare, partially coated and totally PVC coated versions. We also sent additional pole line hardware products for attachment to your mock up tracker piers.

Both Tim Wedding and I reached out to Mr. Lamb in the time frame following the meeting, including prior to his leaving First Solar, in an effort to follow up on our meeting and get a new point of contact. Mr. Lamb did not return our requests.

On September 15, 2015, we were contacted by a supplier to provide a quote for a hanger for use by First Solar, a copy of the document outlining specifications and design is attached. This document was initiated by a "JCL" which is presumably Jeff Lamb, on April 9, 2015, the week following our delivery of samples.

While at the Solar Power International trade show, we were approached by several representatives of First Solar, who stopped by our booth. One was a Ryan, last name unknown, who indicated that he and 2 of his engineers from Bridgewater would be stopping by to go over design changes that they wanted to make and that they were eager on moving forward. Others

CAB, EX2014

1 of 3

CONFIDENTIAL PROTECTIVE ORDER MATERIAL

Case No. IPR2024-00178
10/20/2022, 11:29 AM
1 of 4

Firefox

<https://outlook.office.com/mail/asmith@cabproducts.com/AAMk...>

looked at the CAB displays and mentioned that they had seen similar designs in their work locations and even inquired if CAB was selling to First Solar.

It appears that there has been some confusion likely brought on by the departure of Jeff Lamb, and that someone may have picked up where Mr. Lamb left off without knowing the origin of the Cable Hangers, and the involvement with CAB. Understandably, we were very surprised to see the attached drawing of a CAB hanger as a First Solar design.

It is CAB's desire to provide high quality cable management solutions for First Solar at a competitive price point, and we are very excited about this possibility. Please call me if you have any questions or need additional information. Also, I have linked our website CAB Products Website. Under the Products tab you can see some of CAB's Solar Wire Management Product Line.

Thank you very much for your time and cooperation in reviewing this matter. We look forward to serving you in the future.

Best Regards,

Allen Smith

General Manager, Ebensburg Division
CAB

Phone: 814-472-5077

Fax: 814-472-7179

E-Mail: asmith@cabproducts.com

Website: www.cabproducts.com



Paper 31 (POR), 51-54; Paper 62 (Sur-Reply), 16-18

(EX2014)

Copying – October 2, 2015

Firefox

<https://outlook.office.com/mail/asmith@cabproducts.com/AAMk...>

FW: First Solar RFQ - Wire Management

Allen Smith <asmith@cabproducts.com>

Fri 10/2/2015 3:30 PM

To: smurphy@firstsolar.com <smurphy@firstsolar.com>

Cc: Terry Moore <TMoore@swfastener.com>; Tim Wedding <twedding@cabproducts.com>

Steve,

Good afternoon. Terry Moore from Southwest Fastener is asking for a quote on the hanger drawing that I sent to you in my e-mail from September 21st which is a **proprietary design for which we are seeking patent protection**. We also had an NDA in place with First Solar before our meeting with Jeff Lamb in March where we brought him over a dozen different hanger designs. We continue to be in communication with Southwest Fastener on this hanger and would like your direction on how we should proceed.

CAB is very interested in designing and supplying hangers that will help to lower labor and material costs in your solar projects. For CAB, two million of these hangers would create approximately 40 jobs for persons with severe disabilities. For a firsthand look at what the impact of these hangers would be in human terms, I would like to invite you to visit our facilities in Johnstown and Ebensburg, PA at your earliest convenience.

Thank you very much for your assistance with this project and have a great weekend.

Best Regards,

Allen Smith

General Manager, Ebensburg Division

CAB

Phone: 814-472-5077

Fax: 814-472-7179

E-Mail: asmith@cabproducts.com

Website: www.cabproducts.com



1 of 1

CONFIDENTIAL PROTECTIVE ORDER MATERIAL

CAB, EX2015
Case No. IPR2024-00178
10/2/2022, 11:22 AM
1 of 1

“Terry Moore from Southwest Fastener is asking for a quote on the hanger drawing that I sent to you in my e-mail from September 21st which is a **proprietary design for which we are seeking patent protection.**”

(EX2015)

Paper 31 (POR), 51-54; Paper 62 (Sur-Reply), 16-18

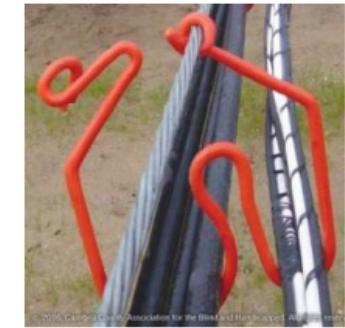
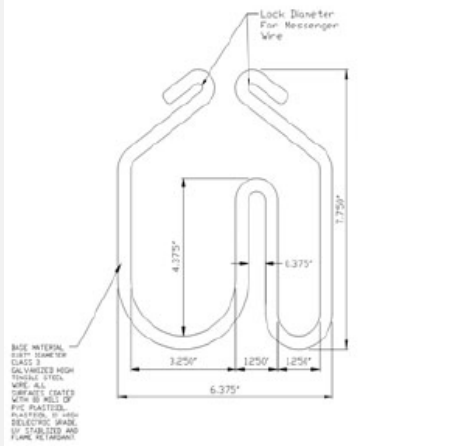
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(EX2030, 8)
CAB Two-Carrier Hanger,
June 2014

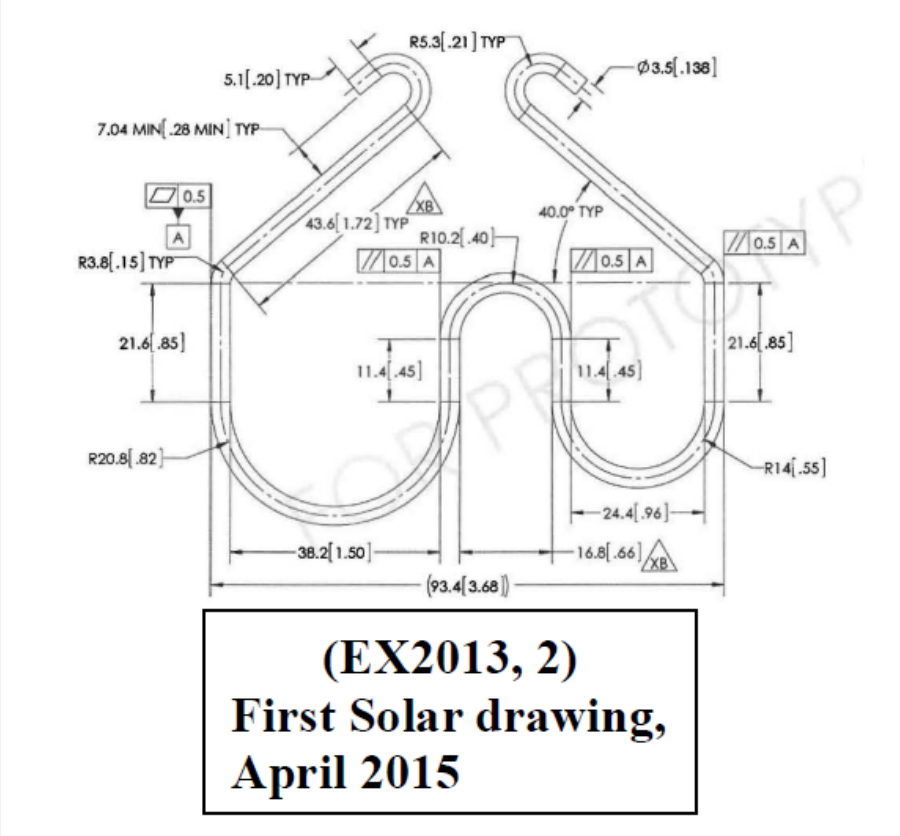


(EX1032, 13)
CAB Two-Carrier Hanger,
September 2014



(EX2041, 5)
CAB Two-Carrier Hanger,
January 2022

(EX2050, 2)
CAB Two-Carrier Hanger,
2017



(EX2013, 2)
First Solar drawing,
April 2015

Paper 62 (Sur-Reply), 16-18

Industry Praise



(EX2009)

Paper 31 (POR), 60-61; Paper 62 (Sur-Reply), 18-20

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE



14 CAB Products – cable management rings and saddles

CAB's highly-rated cable rings and saddles are proving to be a low-cost alternative to cable trays, yet still cut BoS installation costs and avoid maintenance problems in the future. The 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. The PVC coating has a dielectric breakdown strength of 400 volts per mil, is flame retardant, UV stabilized and abrasion resistant. The company cites a five-second installation time for its rings.

The array-changer: An Intersolar 2014 Finalist, that the NGO Cambria County Association for the Blind and Handicapped turns out highly innovative and durable products is a reason to be cheerful.

Paper 31 (POR), 60-61; Paper 62 (Sur-Reply), 18-20

(EX2016, 1, 6)

Industry Praise

- Standard System became the ***industry standard*** (EX2028, ¶48)
- Standardization of solar trackers with CAB's Standard System (EX2028, ¶49; EX2006, ¶64)
- Recommendation of CAB Standard System for numerous utility scale solar projects (EX2059, ¶¶54-55)

Paper 31 (POR), 60-61; Paper 62 (Sur-Reply), 18-20

Industry Praise

- “By the time I started FTC Solar in 2017, CAB’s above-ground cable management system was considered the **industry standard** for cable management designs and specifications for utility-scale solar energy plants.” (EX2028, ¶48)
- “Because CAB had become the **industry standard** for quality and reliability, the Voyager tracker system, as sold out of the box, was **specifically designed** to be compatible with CAB’s above-ground cable management system.” (EX2028, ¶49)
- “Array Technologies Inc. (“ATI”), the leading solar tracking solutions and services provider for utility-scale projects ... decided to **pre-punch a series of holes** on both sides of ATI’s piers for the fast and easy installation of CAB’s L brackets.” (EX2006, ¶64)

Paper 31 (POR), 60-61; Paper 62 (Sur-Reply), 18-20

Long-Felt Need

- PV wire management described as “the ***Achilles heel*** of the majority of PV installations.”
 - Need for improved cable-management dates ***as far back as 2000*** (*EX1011, 2; EX2059, ¶49; EX2038, ¶¶11, 200*)
- Prior cable management option: trenching and cable trays
 - Expensive and inefficient (*EX2028, ¶¶27-29*)



VS



(*EX2030, 13*)

Paper 31 (POR), 62-64; Paper 62 (Sur-Reply), 21-22

Industry Skepticism

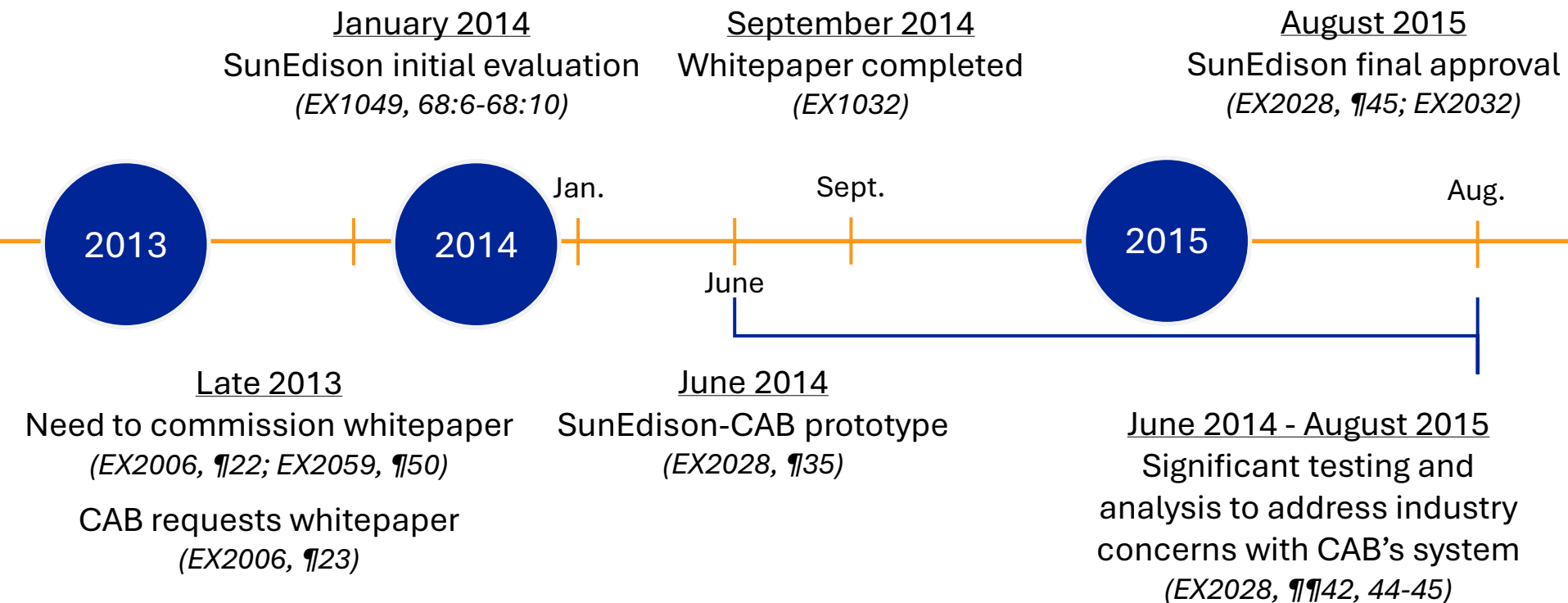
“[I]t is the ***norm for new solar technologies to be faced with significant industry skepticism***, and such new technologies can only be successfully adopted after significant analysis, testing, and confirmation.” (EX2038, ¶219)

- Code compliance
- Extreme environmental conditions
- Installability
- Practicality
- Reliability
- Cost
- Structuring hanger support system
- Sway/fray of power cable jackets
- UV and radiation resistance

(EX2028, ¶34; EX2059, ¶¶46-48)

Paper 31 (POR), 64-66; Paper 62 (Sur-Reply), 20-21

Industry Skepticism



Paper 31 (POR), 64-66; Paper 62 (Sur-Reply), 20-21

Industry Skepticism

Nearly ***two years*** of ***non-routine*** testing

- SunEdison Prototype (June 2014):
 - Installability and practicality in utility-scale
 - Physical support of the system
 - Installation and maintenance cost (including labor)
 - Component cost
 - Corrosion in various environments
 - Reliability
 - Compliance with safety codes
- Additional SunEdison vetting work (June 2014 to August 2015):
 - Code issues
 - Reliability concerns
 - Contingency plans if failure in field
 - Engineering assessments:
 - Wind, snow and ice loading
 - UV tolerance of cable jackets and plastics
 - Galvanic corrosion concerns
 - Cyclic water and dielectric strength tests

(EX2028, ¶35)

(EX2028, ¶¶42, 45)

Paper 31 (POR), 64-66; Paper 62 (Sur-Reply), 20-21

Industry Skepticism

- CAB Overcoming Skepticism:
 - Prototyping
 - Testing (including to obtain UL safety listings)
 - Analyzing NEC and local electrical code requirements
 - Designing and developing multicarrier hangers
 - Designing and testing other components of the system
 - Addressing concerns raised by SunEdison engineers and other solar companies (*EX2010, EX2011, EX2019*)
- (*EX2006, ¶¶33, 41, 42, 61*)

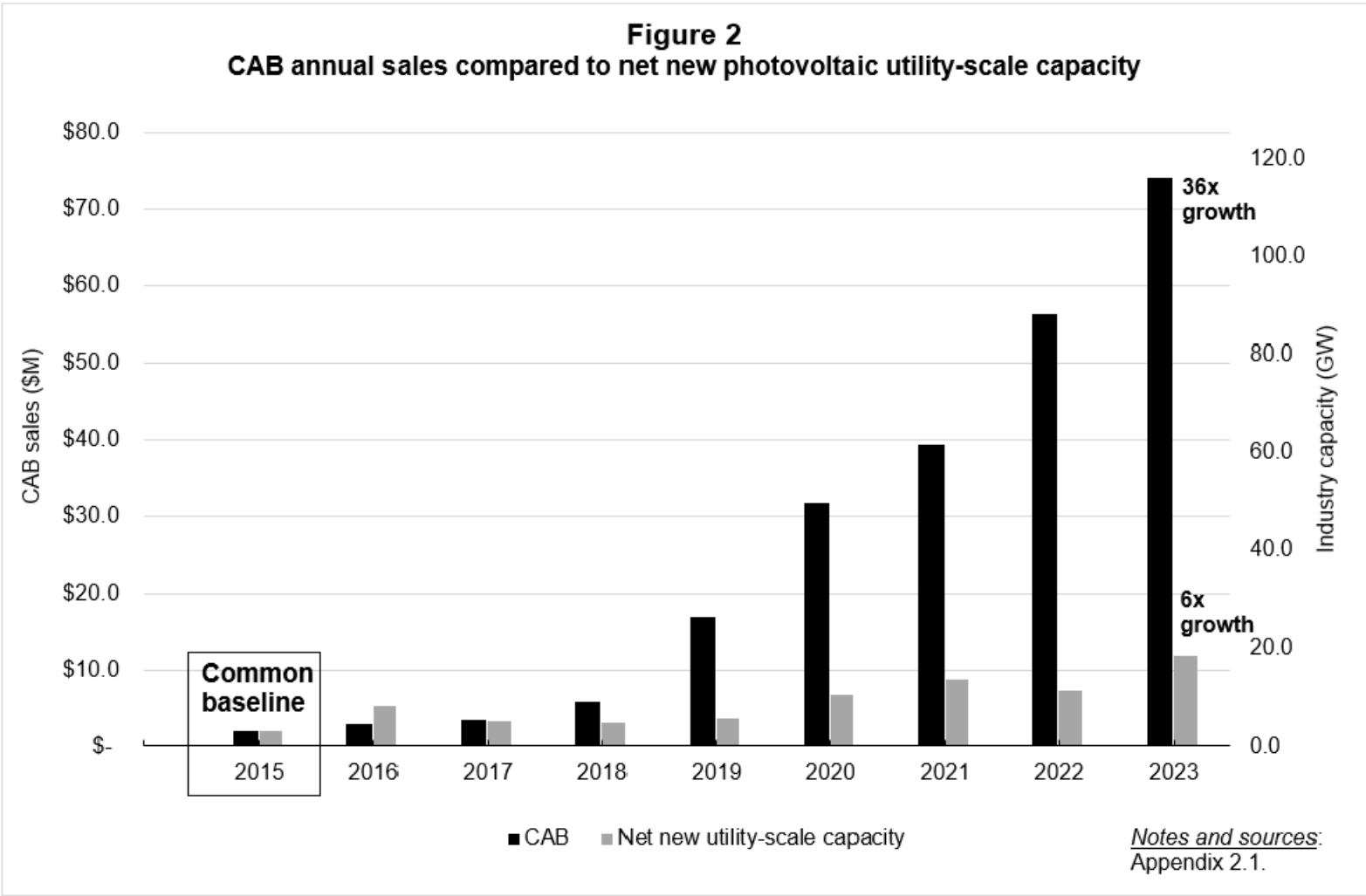
Paper 31 (POR), 64-66; Paper 62 (Sur-Reply), 20-21

Commercial Success

- Commercial success is typically shown with evidence of **“significant sales in a relevant market”**
 - *Chemours Co. FC, LLC v. Daikin Indus., Ltd.*, 4 F.4th 1370 (Fed. Cir. 2021)
- CAB’s sales substantially in excess of Net New PV Capacity

Paper 31 (POR), 54-60; Paper 62 (Sur-Reply), 22

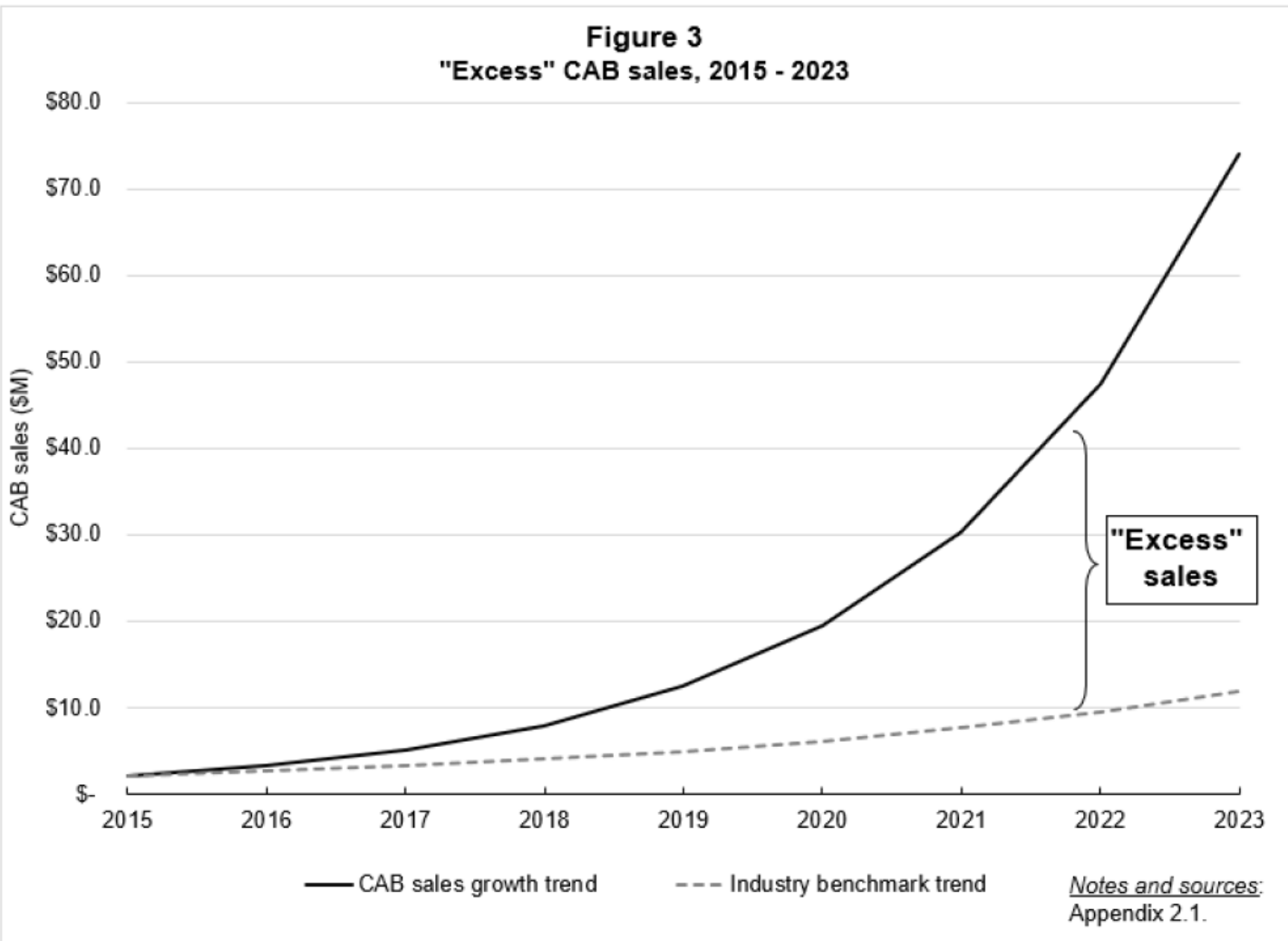
Commercial Success



Paper 31 (POR), 57-58; Paper 62 (Sur-Reply), 22, 25

(EX2044, ¶147)

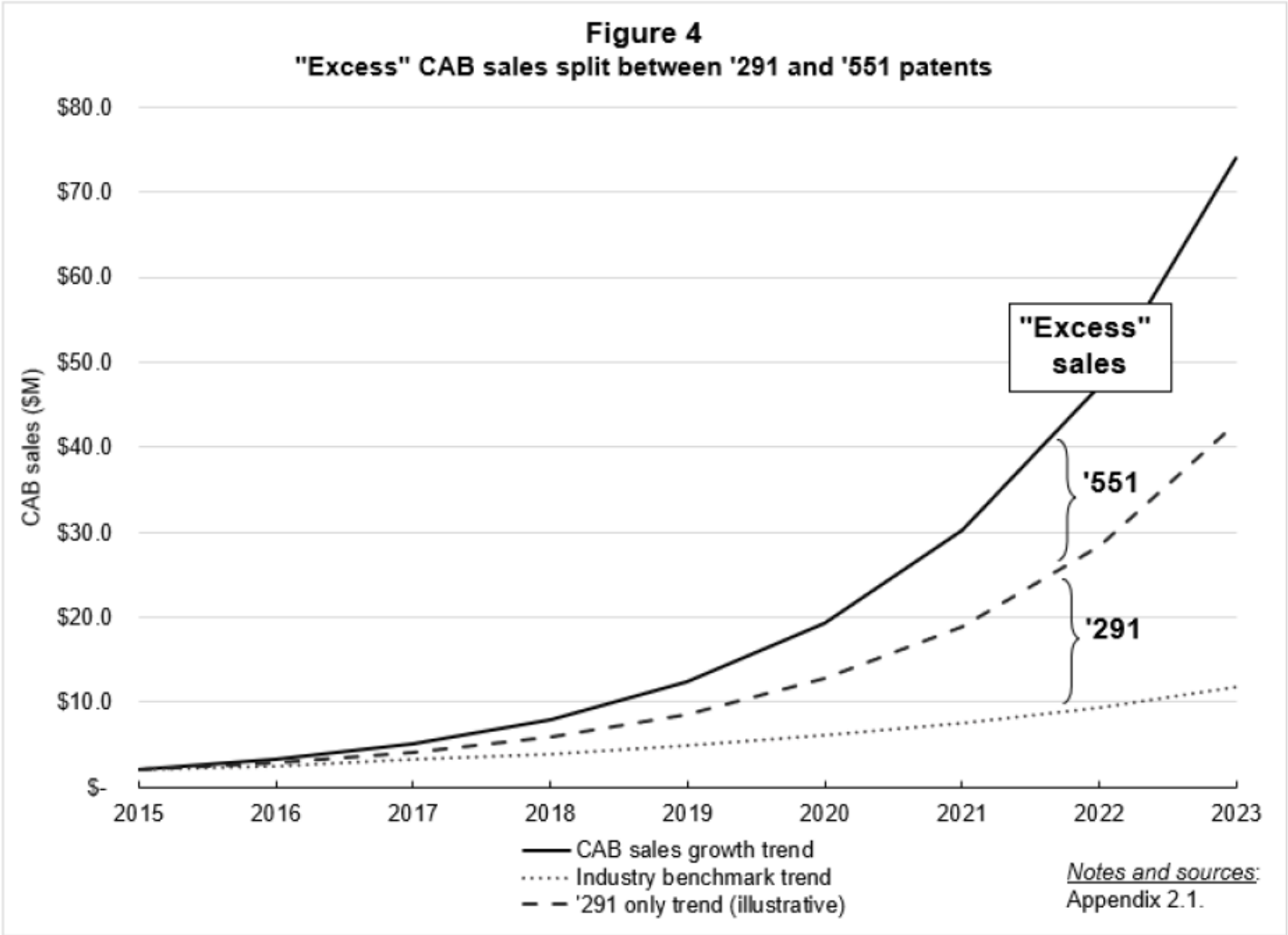
Commercial Success



Paper 31 (POR), 57-58; Paper 62 (Sur-Reply), 22, 25

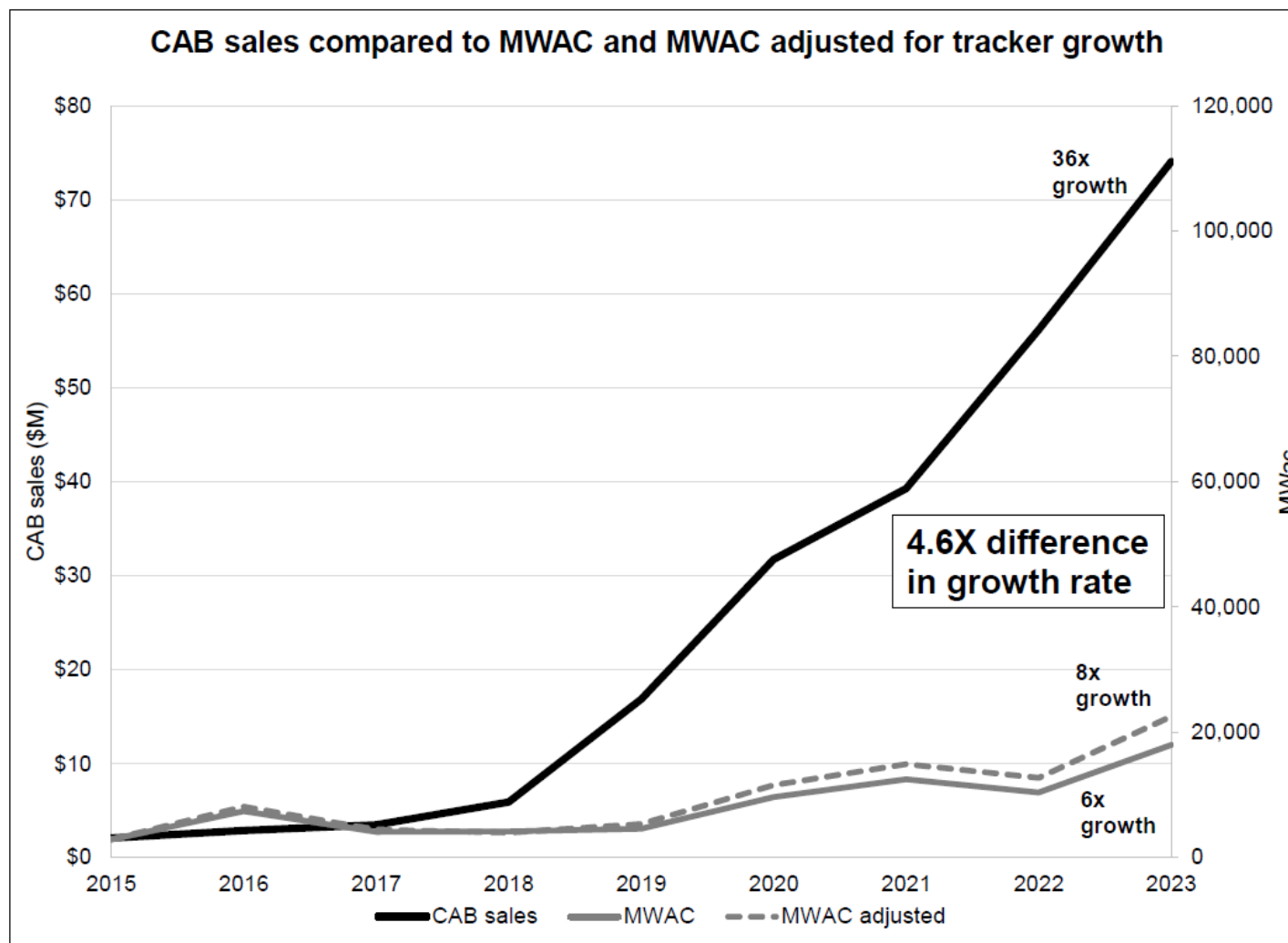
(EX2044, ¶149)

Commercial Success



Paper 31 (POR), 58-60; Paper 62 (Sur-Reply), 22, 27-28 (EX2044, ¶62)

Commercial Success – Increased Use of Trackers



Paper 62 (Sur-Reply), 23-24

(EX1055, 117, Exhibit 6.2; EX2064, 72:22-73:11)