

Filed on behalf of Voltage, LLC
By: Robert M. Hansen
Tony A. Gayoso
Matthew J. Anderson
Scott B. Amankwatia
The Marbury Law Group, PLLC
11800 Sunrise Valley Drive, 15th Floor
Reston, VA 20191
Tel: (703) 391-2900
Fax: (703) 391-2901

David Okano
White & Case LLP
3000 El Camino Real, 2 Palo Alto Square, Suite 900
Palo Alto, CA 94306
Tel: 650-213-0300
Fax: 650-213-8158

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT NO. 10,992,254**

**Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MANDATORY NOTICES (37 C.F.R. § 42.8(A)(1))	1
III.	GROUND FOR STANDING (37 C.F.R. § 42.104(A))	4
IV.	IDENTIFICATION OF CHALLENGE (37 C.F.R. § 42.104(B))	4
	A. Priority Date and Applicable Statutes.....	4
	B. Citation of Prior Art.....	4
	C. Statutory Grounds for Challenge	6
V.	THE '254 PATENT	7
	A. Overview.....	7
	B. Prosecution History	8
	C. Level of Ordinary Skill in the Art.....	9
	D. Claim Construction	9
VI.	GROUND OF REJECTION	11
A.	GROUND 1: CLAIMS 1-5 AND 7-15 ARE UNPATENTABLE UNDER 35 U.S.C. § 103 AS OBVIOUS BASED ON AMPHENOL, SHAO, AND YAMAWAKI.....	12
	Motivation to Combine Amphenol, Shao and Yamawaki.....	12
	1. Claim 1.....	16
	2. Claim 2.....	33
	3. Claim 3.....	34
	4. Claim 4.....	35
	5. Claim 5.....	36
	6. Claim 7.....	37
	7. Claim 8.....	42

8. Claim 9.....	43
9. Claim 10.....	43
10. Claim 11.....	43
11. Claim 12.....	44
12. Claim 13.....	44
13. Claim 14.....	44
14. Claim 15.....	46
B. GROUND 2: CLAIM 6 IS UNPATENTABLE UNDER 35 U.S.C. § 103 AS OBVIOUS BASED ON AMPHENOL, SHAO, YAMAWAKI, AND TAMURA.....	46
Motivation To Combine Amphenol, Shao, Yamawaki, and Tamura	46
1. Claim 6.....	48
C. GROUND 3: CLAIMS 1-15 ARE UNPATENTABLE UNDER 35 U.S.C. § 103 AS OBVIOUS BASED ON AMPHENOL, YU, YAMAWAKI, AND TAMURA.....	49
Motivation to Combine Amphenol Yu, Yamawaki, and Tamura	49
1. Claim 1.....	52
2. Claim 2.....	63
3. Claim 3.....	64
4. Claim 4.....	65
5. Claim 5.....	66
6. Claim 6.....	67
7. Claim 7.....	67
8. Claim 8.....	68
9. Claim 9.....	68
10. Claim 10.....	68
11. Claim 11.....	68

12. Claim 12.....	68
13. Claim 13.....	68
14. Claim 14.....	68
15. Claim 15.....	70
D. GROUND 4: CLAIMS 1-5 AND 7-15 ARE UNPATENTABLE UNDER 35 U.S.C. § 103 AS OBVIOUS IN VIEW OF YAMAWAKI AND SHAO.	70
Motivation to Combine Yamawaki and Shao.....	70
1. Claim 1.....	71
2. Claim 2.....	84
3. Claim 3.....	85
4. Claim 4.....	86
5. Claim 5.....	87
6. Claim 7.....	88
7. Claim 8.....	96
8. Claim 9.....	97
9. Claim 10.....	98
10. Claim 11.....	98
11. Claim 12.....	99
12. Claim 13.....	99
13. Claim 14.....	99
14. Claim 15.....	100
VIII. CONCLUSION	104

TABLE OF AUTHORITIES

Cases

<i>Advanced Bionics, LLC v. MED-EL Elektromedizinische Gerate GmbH</i> , IPR2019-01469, Paper 6, 8-9 (Feb. 13, 2020)	103
<i>Apple v. Fintiv</i> , IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential)	102
<i>Cellco Partnership v. Huawei Device Co.</i> , IPR2020-01117, Paper 10, 13 (Feb. 3, 2021)	105
<i>Graham v. John Deere Co.</i> , 383 U.S. 1 (1966)	12
<i>KSR Int’l Co. v. Teleflex, Inc.</i> , 550 U.S. 398 (2007)	12
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005) (en banc)	9
<i>Sotera Wireless, Inc., v. Masimo Corp.</i> , IPR2020-01019, Paper 12 at 19 (P.T.A.B. Dec. 1, 2020) (precedential, designated Dec. 17, 2020)	102

Statutes

35 U.S.C. § 314(a)	101
35 U.S.C. § 325(d)	102, 103
35 U.S.C. § 102	4
35 U.S.C. § 103	passim

Rules

37 C.F.R. § 42.10(a)	2
37 C.F.R. § 42.10(b)	2
37 C.F.R. § 42.104(a)	4
37 C.F.R. § 42.8(a)(1)	1
37 C.F.R. § 42.8(b)(2)	2
37 C.F.R. § 42.8(b)(3)	2
37 C.F.R. § 42.100(b)	9

EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 10,992,254 to Solon (“’254 Patent”)
1002	Prosecution History of ’254 Patent
1003	Declaration of Thomas W. Kenny
1004	Curriculum Vitae of Thomas W. Kenny
1005	U.S. Published Patent Application No. 2011/0209741 to Solon (“Solon741”)
1006	U.S. Patent No. 6,268,559 to Yamawaki
1007	“Solar Line – Photovoltaic Interconnections System – Helios,” Amphenol Industrial Solar Technologies (“Amphenol”)
1008	Chinese Patent No. CN 2785100 to Shao et al. (“Shao”) – <i>Translation Certified</i>
1009	Japanese Published Patent Application No. 4080663 to Tamura (“Tamura”) – <i>Translation Certified</i>
1010	“National Electrical Code 2002,” by National Fire Protection Association (“NEC2002”)
1011	“Photovoltaic System Engineering, Second Edition,” (“PSE textbook”)
1012	Chinese Patent No. CN 2785100 to Shao et al. (“Shao”) – Original
1013	Japanese Published Patent Application No. 4080663 to Tamura (“Tamura”) – Original
1014	’254 Patent priority Provisional Patent Application (“254 Provisional”)
1015	Chinese Application Pub. No. CN 102332345 A to Yu et al. (“Yu”) – <i>Translation Certified</i>
1016	Chinese Application Pub. No. CN 102332345 A to Yu et al. (“Yu”) – Original

Exhibit No.	Description
1017	Order No. 16: In the Matter of CERTAIN PHOTOVOLTAIC CONNECTORS AND COMPONENTS THEREOF, Inv. No. 337-TA-1365, (Int’l Trade Comm., February 20, 2024)
1018	Shoals Technologies Group, LLC v. Voltage, LLC et al., Docket No. 1:23-cv-00365, Order on Motion to Stay, Dkt. 20 (M.D.N.C. June 28, 2023)
1019	Japanese Patent Application KOKAI Publication No. 7-131045 to Ito (“Ito”) – Original
1020	U.S. Patent No. 11,689,153 to Solon (“’153 patent”)
1021	Prosecution History of the ’153 patent
1022	Japanese Patent Application KOKAI Publication No. 7-131045 to Ito (“Ito”) – Machine Translation
1023	U.S. Patent No. 3,852,516 to Vander Ploog, et al. (“Vander Ploog”)
1024	Amphenol Declaration of Gary Joseph (“Joseph Decl.”)
1025	U.S. Published Patent Application No. 2010/0139733 to Jonczyk et al. (“Jonczyk”)
1026	U.S. Published Patent Application No. 2012/0217973 to Avrutsky (“Avrutsky”)
1027	Wayback Machine, Amphenol-Industrial, web capture, September 2012.

B. CLAIMS LISTING

Claim Number/Element	'254 Patent Claim Limitations
1(Preamble)	A lead assembly for use in a solar energy installation including
1(A)	A first drop line and a second drop line, said first drop line terminating in a drop line connector
1(B)	At least one 30 amp feeder cable terminating in a feeder cable connector, said first drop line and said at least one feeder cable electrically coupled at a nexus;
1(C)	A means for securing said nexus, said securing means selected from the group consisting of compression lug, soldering, splicing, crimping, and combinations thereof;
1(D)	An undermold having an inner surface and an outer surface, both surfaces extending in a longitudinal direction of said at least one feeder cable, said inner surface surrounding and fully encasing said securing means,
1(D)(i)	said inner surface comprised of a first aperture concentric with said securing means and said at least one feeder cable, said first aperture extending continuously through said undermold in said longitudinal direction and having a first diameter,
1(D)(ii)	said at least one feeder cable continuously extending through said first aperture, and
1(D)(iii)	a second aperture concentric with said first drop line and parallel to said first aperture, said second aperture only partially extending through said undermold in said longitudinal direction, said second aperture having a second diameter smaller than said first diameter, said first drop line extending from said second aperture; and
1(E)	An overmold surrounding said undermold and forming an undermold-overmold interface only at said outer surface,
1(E)(i)	wherein said lead assembly combines power from a plurality of solar arrays and transmits that power to an inverter in a

	solar energy installation lacking a combiner box between said solar arrays and said inverter, and
1(E)(ii)	wherein said lead assembly has a voltage rating of 1500 VDC.
2	The lead assembly of claim 1 wherein said first drop line includes a section of exposed wire at said nexus.
3	The lead assembly of claim 2 wherein said at least one feeder cable includes a section of exposed wire at said nexus.
4	The lead assembly of claim 1 wherein said overmold defines at least one aperture.
5	The lead assembly of claim 1 wherein said undermold is injection molded.
6	The lead assembly of claim 1 wherein said overmold is injection molded.
7(Preamble)	A solar power system comprising:
7(A)	A first plurality of solar panels electrically coupled by a first wire harness to form a first solar array;
7(B)	A second plurality of solar panels electrically coupled by a second wire harness to form a second solar array;
7(C)	A lead assembly including
7(C)(i)	a first drop line electrically connected to said first wire harness, and
7(C)(ii)	a 30 amp feeder cable electrically connected to a component selected from the group consisting of a trunk buss jumper, an inverter, a connection unit, a recombiner, and a disconnect unit,
7(C)(iii)	said first drop line and said feeder cable electrically connected at a first nexus secured by a compression lug,
7(C)(iv)	said compression lug surrounded by an undermold having an inner surface and an outer surface, both surfaces extending in

	a longitudinal direction of said feeder cable, said inner surface surrounding and fully encasing said compression lug,
7(C)(v)	said inner surface comprised of a first aperture concentric with said compression lug and said feeder cable, said first aperture extending continuously through said undermold in said longitudinal direction and having a first diameter,
7(C)(vi)	said feeder cable extending continuously through said first aperture, and
7(C)(vii)	a second aperture concentric with said first drop line and parallel to said first aperture, said second aperture only partially extending through said undermold in said longitudinal direction, said second aperture having a second diameter smaller than said first diameter, said first drop line extending from said second aperture,
7(C)(viii)	with said undermold surrounded by an overmold and forming an undermold-overmold interface only at said outer surface,
7(C)(ix)	wherein said lead assembly has a voltage rating of 1500 VDC; and
7(D)	A second drop line electrically connected to said second wire harness,
7(D)(i)	said second drop line electrically connected to said feeder cable at a second nexus,
7(D)(ii)	wherein the solar power system doesn't include a combiner box upstream of said component.
8	The solar power system of claim 7 wherein said lead assembly includes an end piece.
9	The solar power system of claim 7 wherein said first drop line terminates in a drop line connector.
10	The solar power system of claim 7 wherein said feeder cable terminates in a feeder cable connector.
11	The solar power system of claim 7 wherein said first drop line includes 18 to 4 gauge wire.

12	The solar power system of claim 7 wherein said feeder cable includes 6 gauge to 1000 MCM wire.
13	The solar power system of claim 7 wherein said first nexus is surrounded by said compression lug.
14(Preamble)	A method of constructing a solar power installation including the steps of:
14(A)	Connecting a first plurality of solar panels to a first wire harness to form a first solar array;
14(B)	Connecting said first wire harness to a first drop line of a lead assembly;
14(C)	Connecting a second plurality of solar panels to a second wire harness to form a second solar array;
14(D)	Connecting said second wire harness to a second drop line of said lead assembly; and
14(E)	Electrically coupling said lead assembly to an inverter without electrically coupling to a combiner box;
14(E)(i)	wherein said lead assembly includes said first drop line electrically connected to said first wire harness, and a 30 amp feeder cable terminating in a feeder cable connector, said first drop line and said feeder cable electrically connected at a first nexus secured by a means for securing said nexus, said securing means selected from the group consisting of compression lug, soldering, splicing, crimping, and combinations thereof, said securing means surrounded by an undermold having an inner surface and an outer surface, both surfaces extending in a longitudinal direction of said feeder cable, said inner surface surrounding and fully encasing said securing means, said inner surface comprised of a first aperture concentric with said securing means and said at least one feeder cable, said first aperture extending continuously through said undermold in said longitudinal direction and having a first diameter, said feeder cable continuously extending through said first aperture, and a second aperture concentric with said first drop line and parallel to said first aperture, said second aperture only partially extending

	through said undermold in said longitudinal direction, said second aperture having a second diameter smaller than said first diameter, said first drop line extending from said second aperture,
14(E)(ii)	with said undermold surrounded by an overmold and forming an undermold-overmold interface only at said outer surface,
14(E)(iii)	wherein said lead assembly has a voltage rating of 1500 VDC.
15	The method of claim 14 wherein said step of electrically coupling said lead assembly to an inverter includes the steps of electrically coupling said feeder cable to said inverter.

I. Introduction

Voltage LLC (“Petitioner”) petitions for *inter partes* review of claims 1-15 of U.S. Patent No. 10,992,254 to Solon, entitled “Lead Assembly for Connecting Solar Panel Arrays to Inverter” (“the ’254 patent,” EX1001), which PTO records say is assigned to Shoals Technologies Group, LLC (“PO”). EX1001, Cover.

The challenged claims recite well-known and conventional electrical wiring configurations for solar panels in solar installations. All claims are invalid as obvious, improperly claiming combinations of known wiring configurations, electrical connections, and molding techniques disclosed in printed publications before the earliest priority date. The ’254 Patent claims were allowed based on limitations suggested by the Examiner that were not separately searched. However, as will be shown, those added limitations are no more novel than the other limitations the Examiner had rejected numerous times.

II. Mandatory Notices (37 C.F.R. § 42.8(a)(1)) REAL PARTY IN INTEREST:

The real parties-in-interest are Voltage, LLC, a North Carolina corporation, and Ningbo Voltage Smart Production Co., a limited liability company formed under the laws of the People’s Republic of China.

LEAD AND BACKUP COUNSEL:

Pursuant to 37 C.F.R. § 42.8(b)(3) and 37 C.F.R. § 42.10(a), Petitioner appoints:

Robert M. Hansen (Reg. No. 43,656) as lead counsel,

Tony A. Gayoso (Reg. No. 37,331) as back-up counsel,

Scott B. Amankwatia (Reg. No. 78,226) as back-up counsel,

Matthew J. Anderson (Reg. No. 78,257) as back-up counsel, and

David Okano (Reg. No. 66,657) as back-up counsel.

Pursuant to 37 C.F.R. § 42.10(b), a power of attorney is filed with this designation of counsel.

RELATED MATTERS:

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner identifies the following related matters:

- *In the Matter of CERTAIN PHOTOVOLTAIC CONNECTORS AND COMPONENTS THEREOF*, Inv. No. 337-TA-1365, (Int’l Trade Comm. (“ITC”)), ’254 patent claims terminated.
- *Shoals Technologies Group, LLC v. Voltage, LLC et al*, Docket No. 1:23-cv-00365 (M.D.N.C.), currently stayed. See EX1018.

SERVICE INFORMATION:

Petitioner provides the following service information for designated counsel:

The Marbury Law Group, PLLC
11800 Sunrise Valley Drive
15th Floor
Reston, VA 20191
Tel: (703)-391-2900
Fax: (703)-391-2900

David Okano
White & Case LLP
3000 El Camino Real, 2 Palo Alto Square, Suite 900
Palo Alto, CA 94306
Tel: 650-213-0300
Fax: 650-213-8158

Petitioner consents to electronic service by email to the email addresses:

rhansen@marburylaw.com;

tgayoso@marburylaw.com;

samankwatia@marburylaw.com;

manderson@marburylaw.com;

pat-docketing@marburylaw.com;

david.okano@whitecase.com; and

javi.vazquez@whitecase.com.

PAYMENT OF FEES:

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 18-1579.

III. Grounds for Standing (37 C.F.R. § 42.104(a))

Petitioner certifies that the '254 patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

IV. Identification of Challenge (37 C.F.R. § 42.104(b))

A. Priority Date and Applicable Statutes

The '254 patent claims priority to U.S. Provisional Application No. 62/047,773 filed 9/9/2014. EX1001, Cover. While Petitioner reserves the right to challenge the priority date of the '254 patent in other litigation, the earliest priority date is assumed to be 9/9/2014 (“the '254 priority date”) for this IPR. Accordingly, the claims should be evaluated under the current (i.e., post-AIA) version of 35 U.S.C. §§ 102, 103.

B. Citation of Prior Art

Petitioner cites the following prior art references:

“Solar Line – Photovoltaic Interconnections System – Helios,”

Amphenol Industrial Solar Technologies

(“Amphenol,” EX1007) is prior art under AIA § 102(a) because it was published on November 30, 2012, before the ’254 priority date. Amphenol was not submitted to or considered by the Examiner.

Chinese Patent No. 2785100 to Shao et al.

(“Shao,” EX1008) is prior art under 35 U.S.C. §§ 102(a)(1) because it was published on May 31, 2006, before the ’254 priority date. Shao was not identified to or considered by the Examiner.

U.S. Patent No. 6,268,559 to Yamawaki

(“Yamawaki,” EX1006) is prior art under 35 U.S.C. §§ 102(a)(1) because it was published on July 31, 2001, before the ’254 priority date. The Examiner asserted Yamawaki in prosecution against various claims, but Applicant did not overcome the Examiner’s assertions regarding Yamawaki.

Japanese Published Patent Application No. 4080663 to Tamura

(“Tamura,” EX1009) is prior art under 35 U.S.C. §§ 102(a)(1) because it was published on April 23, 2008, before the ’254 priority date. Tamura was not identified to or considered by the Examiner.

Chinese Patent No. 102332345 to Yu et al.

(“Yu,” EX1015) is prior art under 35 U.S.C. §§ 102(a)(1) because it was published on January 25, 2012, before the ’254 priority date. Yu was not

identified to or considered by the Examiner.

C. Statutory Grounds for Challenge

Petitioner requests review of claims 1-15 (“Challenged Claims”) on the following grounds:

GROUND 1: Claims 1-5 and 7-15 under AIA 35 U.S.C. § 103(a) as obvious based on Amphenol (EX1007) in view of Shao (EX1008) and Yamawaki (EX1006).

GROUND 2: Claim 6 under AIA 35 U.S.C. § 103(a) as obvious based on Amphenol (EX1007) in view of Shao (EX1008), Yamawaki (EX1006), and Tamura (EX1009).

GROUND 3: Claims 1-15 under AIA 35 U.S.C. § 103(a) as obvious based on Amphenol (EX1007) in view of Yu (EX1015), Yamawaki (EX1006), and Tamura (EX1009).

GROUND 4: Claims 1-5 and 7-15 under AIA 35 U.S.C. § 103(a) as obvious based on Yamawaki (EX1006) in view of Shao (EX1008).

V. The '254 Patent

A. Overview

The '254 patent issued on 4/27/2021 from U.S. Patent Application No. 14/849,458, filed 9/9/2015 (EX1002), which claimed priority to U.S. Provisional Application No. 62/047,773 filed 9/9/2014. (EX1014). EX1001, Cover.

The '254 patent describes lead assemblies for use in solar energy installations. EX1001, Abstract.

Claims 1-6 recite a lead assembly for solar energy installations that includes a first drop line, a feeder cable, a securing means, an undermold, and an overmold. EX1001, 6:43-7:11. Dependent claims 2-6 recite further limitations regarding the drop line, feeder cable, overmold, and undermold. *Id.*, 7:12-23.

Claims 7-13 recite a solar power system that includes multiple solar panels, and a lead assembly with drop lines. *Id.*, 7:24-8:2. Dependent claims 8-13 recite further limitations regarding the lead assembly. *Id.*, 8:3-13.

Claims 14 and 15 recite a method of constructing a solar power installation like that recited in claims 7-13. *Id.*, 8:14-57. Dependent claim 15 recites further limitations regarding electrically coupling the lead assembly to the inverter. *Id.*, 8:54-57.

B. Prosecution History

Prosecution of the 14/849,458 application lasted nearly six years. *See Decl.*, ¶[56]-[63]. Finally, after Applicant failed to overcome the prior art rejections in several Office actions, the Examiner emailed Applicant on 4/22/2020 proposing the following amendment:

Claim 1: D. An undermold having an inner surface and an outer surface, **both surfaces extending in a longitudinal direction of said at least one feeder cable**, said inner surface surrounding and fully encasing said securing means, **said inner surface comprised of a first aperture concentric with said securing means and said at least one feeder cable, said first aperture extending continuously through said undermold in said longitudinal direction and having a first diameter, said at least one feeder cable continuously extending through said first aperture, and a second aperture concentric with said first drop line and parallel to said first aperture, said second aperture only partially extending through said undermold in said longitudinal direction, said second aperture having a second diameter smaller than said first diameter, said first drop line extending from said second aperture**;

EX1002, pp.103-104. Applicant accepted the amendments and introduced conforming amendments to claims 6 and 17. EX1002, pp.65-78.

A Notice of Allowance issued on 2/9/2021 with Examiner amendments to claims 17 and 18. EX1002, pp.51-57.

C. Level of Ordinary Skill in the Art

As established by the Expert Declaration of Thomas W. Kenny dated May 8, 2024 (*See* EX1003, “*Decl.*”), a person having ordinary skill in the art (a “POSITA”) would have a B.S. degree in electrical engineering, mechanical engineering, or an equivalent such as applied physics or general engineering, and two years of professional experience relating to the design and/or manufacturing of electrical wiring and connectors. *Decl.*, ¶¶[49],[50]. Lack of professional experience can be remedied by additional education, and vice versa. *Id.*

References to a POSITA in all cases are a POSITA as of the ’254 priority date.

D. Claim Construction

In this IPR proceeding, claims are interpreted under the same standard applied by Article III courts (i.e., the *Phillips* standard). 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

Some claim terms in the ’254 Patent were construed in the parallel ITC proceeding. *See* ITC Order No 16, EX1017. Petitioner proposes that the Board adopt the claim constructions below from the ITC. However, due to the structural nature of the claims and prior art, the Grounds are consistent with these constructions but do not rely on them for showing obviousness. For all other

terms, Petitioner proposes that claim terms be afforded their plain and ordinary meanings.

Aperture: “Aperture” appears only once in the specification, describing a hole for receiving zip-ties. EX1001, 4:61-63. This differs from the “apertures” recited in the claims regarding the “undermold” of the lead assembly. Consistent with the ITC claim construction, a POSITA would have understood that “aperture” in the claims means a “3-D hole (i.e., the entire pathway for a cable in the [undermold/primary mold]) that exists when viewed as if the entire cable is removed.” EX1017, pp.38-41; EX1003, *Decl.*, ¶[150].

Undermold / Overmold: Consistent with the ITC claim construction, a POSITA would have understood that “undermold” and “overmold” in the claims mean a “material molded over a piece or part that seals against environmental factors.” See EX1017, pp.38-41; see also EX1001, FIGS.48,54,55,60 and generally; *Decl.*, ¶[143]. Although the definition of “undermold” (vs. “primary mold”) in Order 16 related to U.S. Patent No. 10,553,739, which is challenged in another IPR petition, the conclusion is informative. *Id.*

While the '254 Patent uses particular terminology for various elements of its wiring assemblies (e.g., “lead assembly,” “feeder cable,” drop line,” and “wire harness”), a POSITA would understand that such terminology is not universal within the industry, and thus do not define specific structures. *Decl.*, ¶[82]-

[89],[128]. “Wire harnesses” and “lead assemblies” refer to wiring or cable assemblies used for organizing electrical connections within electrical power systems. *Id.* Similarly, “trunk” or “main cable” may refer to “feeder cable,” “branch,” “drop,” “input,” “string,” or “drop line” for wires transmitting electric current between solar panels and electrical connection points in cable assemblies. *Decl.*, ¶¶[76],[83],[85],[268].

VI. Grounds of Rejection

The following discussion and the accompanying evidence demonstrate that there is a reasonable likelihood that Petitioner will prevail with respect to the Challenged Claims.

In all grounds, Petitioner evaluates the scope and content of the prior art, any differences between the art and the claim, and the knowledge of a person of ordinary skill in the art in accordance with *Graham v. John Deere Co.*, 383 U.S. 1 (1966) and *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007). Further, a more than adequate written rationale is provided in each ground to support the combination of the asserted prior art under *KSR*. *Id.*, 418.

A. Ground 1: Claims 1-5 and 7-15 are unpatentable under 35 U.S.C. § 103 as obvious based on Amphenol, Shao, and Yamawaki.

- **Motivation to Combine Amphenol, Shao and Yamawaki**

A POSITA would have been motivated to combine the teachings of Amphenol and Shao (“Amphenol-Shao combination”). *Decl.*, ¶[90]. Amphenol and Shao are analogous prior art in the same field of electrical wiring assemblies and connectors as the ’254 Patent. *Decl.*, ¶¶[93]-[95]. Amphenol discloses wire assemblies, cable junctions, connectors, in-line fuses, and other components on sale for combining and distributing power within a solar array installation. See EX1007, generally; *Decl.*, ¶[91]. Shao discloses detailed designs of cable junctions for power distribution. See EX1008, generally; *Decl.*, ¶[91]. Amphenol focuses on solar array electrical connection systems. Shao compliments this by focusing on power distribution connections of cables and the geometric features and methods of forming molded protection layers of those connections. See EX1007, generally; EX1008, generally; *Decl.*, ¶[91].

A POSITA would appreciate that Shao’s methods for forming electrical connections between cables, the geometric arrangement and configuration of those cables, and the methods for protecting cables and connections from the environment using injection molding, could be applied to the products disclosed in Amphenol. See EX1008, p. 6 and generally; *Decl.*, ¶[96]. Thus, the underlying mechanics, materials, assembly processes, molding processes, and other details are

similar such that a POSITA would have been motivated to consider both publications in combination. *Id.*, ¶[91].

A POSITA would have been motivated to combine the teachings of Amphenol and Shao because the wire harnesses, lead assemblies and solar photovoltaic power generation systems of Amphenol are intended for use in a environment subject to exposure to physical harm and would benefit from added protections from the elements and improved reliability for the branch structures provided by the robust design and manufacturing processes for the connectors disclosed in Shao. *Decl.*, ¶[100]-[104],[107].

A POSITA would have an expectation of success in combining Amphenol and Shao since Shao complements the disclosure of Amphenol by disclosing design and materials that are appropriate choices for these junctions while also providing alternative connector configurations and advantages thereof. *Decl.*, ¶[106].

A POSITA would have been motivated to combine the teachings of Amphenol and Shao with those of Yamawaki (“Amphenol-Shao-Yamawaki combination”). *Decl.*, ¶[109].

Similar to the Amphenol-Shao combination, Yamawaki discloses photovoltaic modules arranged in various ways to overcome challenges and support the design of photovoltaic panel arrays, such as home solar energy

installations. EX1006, 7:54-8:11; *Decl.*, ¶[110]. Yamawaki demonstrates that the feeder wire of a wire harness can be connected to an inverter, such as directly or via another cable. EX1006, FIGS. 4-6; *Decl.*, ¶[110]. Thus, Yamawaki complements the Amphenol-Shao combination by teaching structural arrangements that may reduce costs. *Id.* Yamawaki discloses wire harnesses coupled to other wire harnesses and cable assemblies for combining current from solar panels for delivery to a common connection point, such as the inverter or a junction box. EX1006, FIGS. 3-7; *Decl.*, ¶[110].

Amphenol, Shao, and Yamawaki are analogous prior art because they are in the same field as the '254 Patent. *Decl.*, ¶[111]. Not only do all three references relate to electrical wiring assemblies and connectors, but Amphenol and Yamawaki are particularly directed to solar power wiring assemblies like those claimed in the '254 Patent. *Id.* Yamawaki complements Amphenol and Shao by teaching that the structure of photovoltaic power connectors at any scale can be directly connected to an inverter. *Decl.*, ¶[112].

Yamawaki was addressed in prosecution and asserted against various claims, but the assertions by the Examiner regarding Yamawaki were not overcome by Applicant, but instead bypassed by adding other limitations. See EX1002, pp. 143-151, 169-171, 177-185, 201-203, 219-225.

A POSITA would look to improve the wiring and cable junction assemblies

disclosed by Amphenol and enhanced by the branch connection techniques and arrangement taught by Shao. *Decl.*, ¶[113]. Yamawaki discloses improvements to branch junctions that include a molded body (i.e., an undermold) covered by a cover member (i.e., an overmold). See EX1006, 10:19-22 and FIG. 9B; *Decl.*, ¶[113]. Yamawaki also discloses that such branch junctions provide water-resistance and improved reliability. EX1006, 13:15-18; *Decl.*, ¶[113].

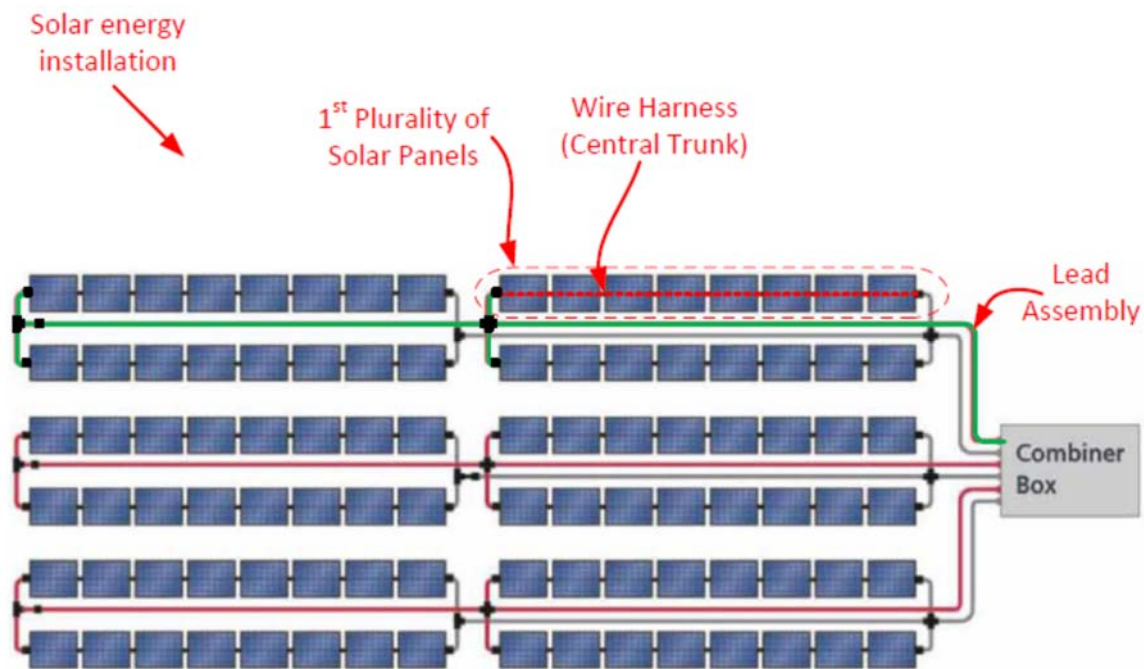
A POSITA would be motivated to combine the teachings of Amphenol, Shao, and Yamawaki, particularly the addition of the overmold in the form of a cover member over an undermold, to achieve improve water-resistance, reliability, and performance. *Decl.*, ¶[114]. Further, a POSITA would have been motivated to use the detailed junction designs, processes, and materials of Shao and Yamawaki with the catalog of wiring harness components of Amphenol to build small-scale or large-scale installations, with specific designs suitable for current ranging from the smallest to the largest amounts contemplated in guidelines likely to be encountered by practitioners. EX1010; *Decl.*, ¶[114].

A POSITA would have had an expectation of success in combining the Amphenol-Shao combination with Yamawaki because the photovoltaic modules and wiring junctions in Yamawaki are designed for use in solar installations based on standard solar panels with current and voltage outputs similar to those in the Amphenol-Shao combination. *Decl.*, ¶[116].

1. Claim 1

1(Preamble)

Amphenol discloses a lead assembly (green) for use in a solar energy installation. EX1007, p.6, middle image; *Decl.*, ¶[127].



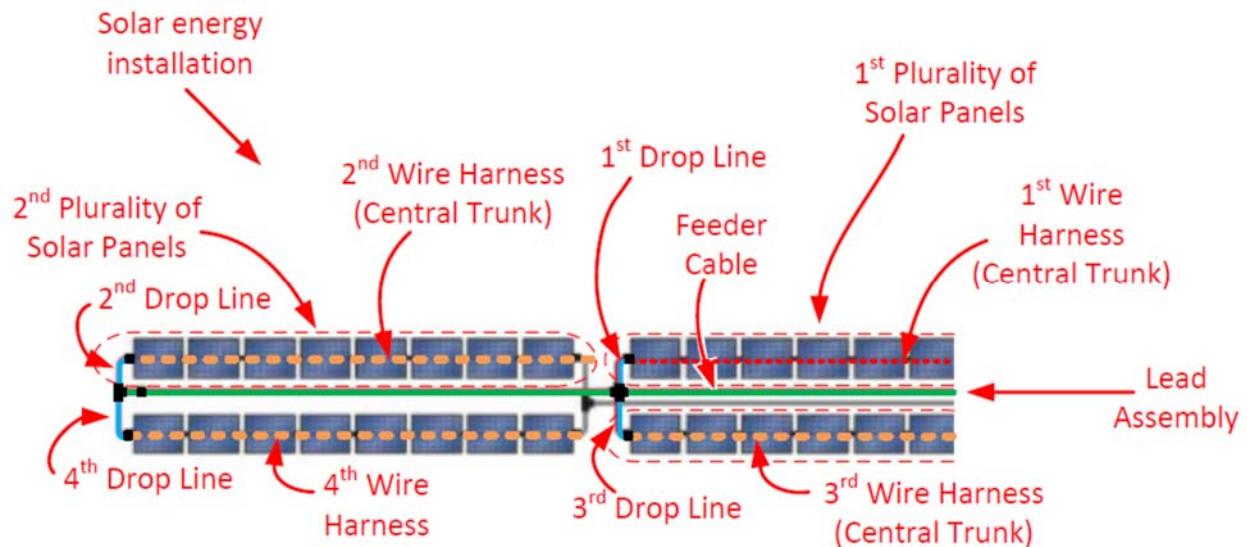
EX1007, p.6, middle image (1st-annotation)

The ‘254 Patent specification does not define the expression “lead assembly” other than saying that a lead assembly includes a feeder cable with drop lines branching off at joints. EX1001, Abstract. A POSITA would understand that feeder cables route power from point to point. *Decl.*, ¶[128]. Amphenol discloses a lead assembly (green) for use in solar energy installations. EX1007, p.6, middle image; *Decl.*, ¶[128].

Thus, the limitation 1(Preamble) is disclosed by Amphenol.

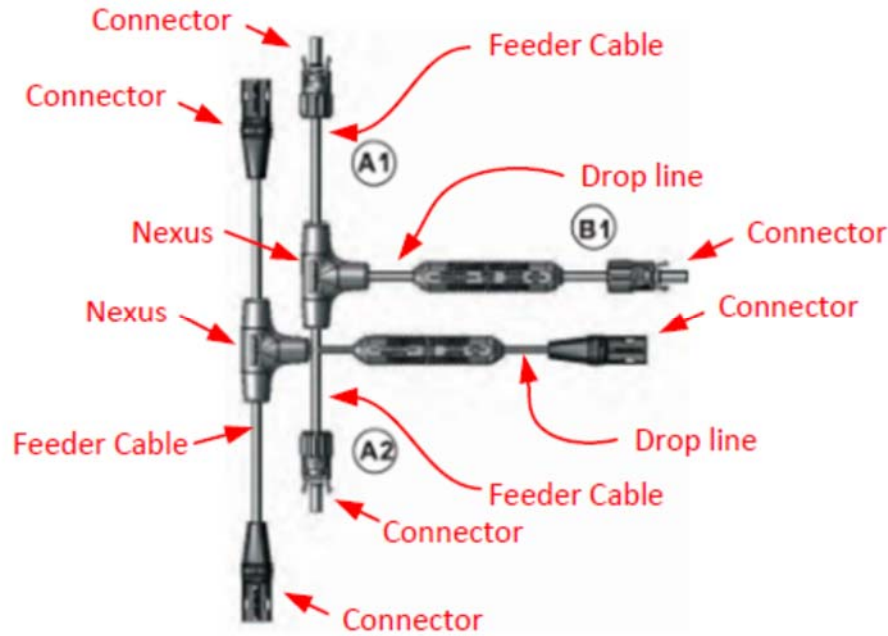
1(A)

Amphenol discloses numerous drop lines (blue) branching from a feeder cable (green) that together form a lead assembly. EX1007, p.6, middle image; Decl., ¶[132].



EX1007, p.6, middle image (2nd-annotation)

Amphenol discloses lead assemblies including first and second drop lines terminating in drop line connectors (small black boxes) at the end of each drop line. EX1007, p.6, middle image, p. 21, top image; Decl., ¶[132].



EX1007, p.21, top image (1st-annotation)

Thus, limitation 1(A) is disclosed by Amphenol.

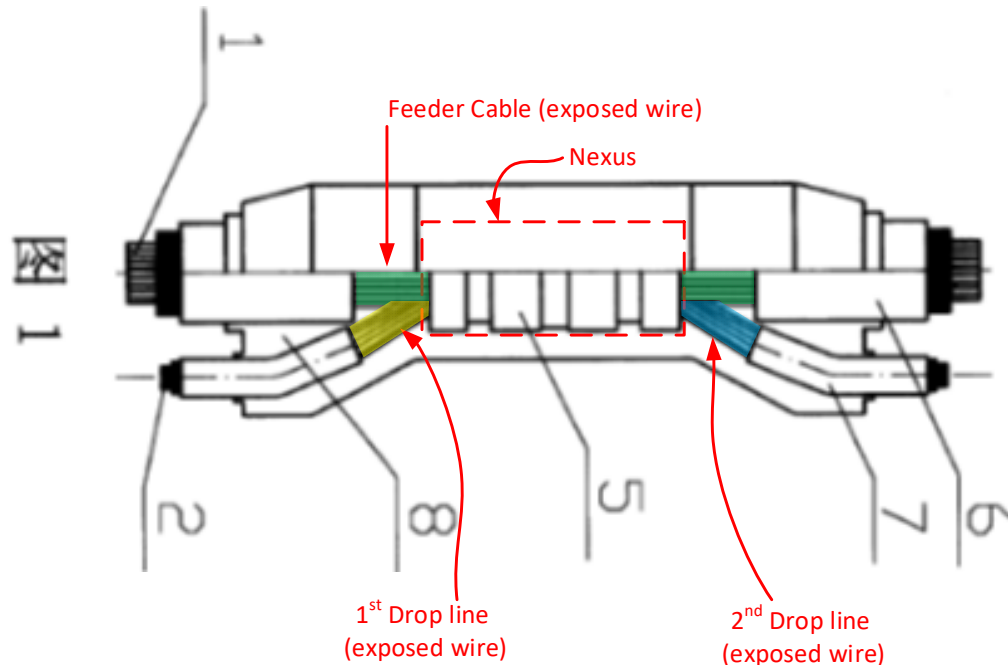
1(B)

Amphenol discloses feeder cables terminating in feeder cable connectors.

EX1007, p.21, top image; *Decl.*, ¶[135]. Amphenol lists gauges for feeder cables (i.e., the main cable) that may be selected for lead assemblies, including 8AWG, 10AWG, 12AWG, or 14AWG. EX1007, p.21 (Main cable size list) *Decl.*, ¶[135]. A POSITA would recognize that either 8AWG or 10AWG cables are rated for 30 amps; thus, Amphenol discloses at least one 30 amp feeder cable. *Decl.*, ¶[135].

Shao discloses details of the feeder cable's electrical coupling to the drop line at the nexus within the description of the K-shaped branch connector, and details associated with the encapsulation of the junction to provide protection from external environments. EX1008, Abstract; *Decl.*, ¶[137]. Shao discloses feeder

cables electrically coupled to drop lines at a nexus that includes a clamp holding the feeder cable in contact with the drop line. EX1008, FIG. 1; *Decl.*, ¶[137].



EX1008, FIG. 1 (1st-annotation)

Shao discloses a nexus configuration with a clamp that maintains contact and good conductivity between the two conductive elements. *Decl.*, ¶[138]. A POSITA would be motivated to combine these elements from Shao with Amphenol to provide cable junctions with increased reliability. *Decl.*, ¶¶[90]-[108],[138].

Thus, limitation 1(B) is disclosed by the Amphenol-Shao combination.

1(C)

A POSITA would understand that the plain and ordinary meaning of “means for securing said nexus” refers to the element or elements maintaining the strong

electrical and mechanical connection between the feeder cable and the drop lines. *Decl.*, ¶[140]. Shao provides a C-shape clamp that is crimped on the feeder cable and drop lines, thus disclosing a means for securing the nexus. *Id.*

Shao discloses feeder cables (i.e., a trunk conductor 1) electrically coupled to drop lines (i.e., a branch-line conductor 2) by an “elongated copper C-shaped clamp [forming] a K-shaped branch connector 5,” which forms a nexus that holds the feeder cable and drop lines together. EX1008, 6:15-18 and FIG. 1; *Decl.*, ¶[141]. “The joint is formed by symmetrical overlapping and crimping of one trunk conductor and two branch-line conductors.” *Id.*, 5:11-13; *Decl.*, ¶[141]. Therefore, it would have been obvious to a POSITA to use a clamp, as taught by Shao, to maintain contact between the three conductive elements. *Decl.*, ¶¶[90]-[108],[141].

Thus, limitation 1(C) is disclosed by the Amphenol-Shao combination.

1(D)

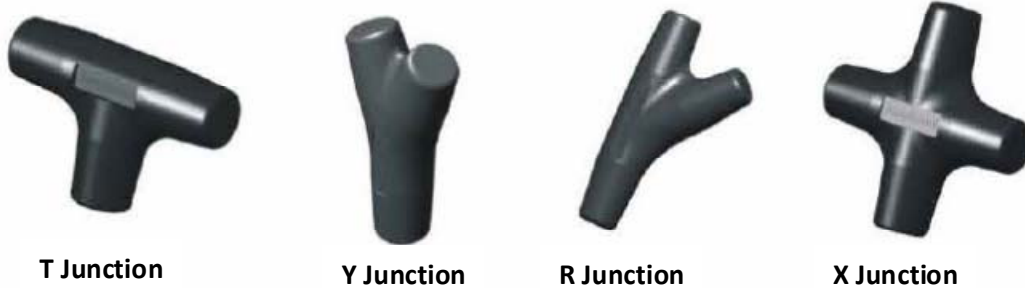
“Undermold”

The '254 Patent specification does not define the “undermold.” EX1001, generally. Based on illustrations in the '254 Patent and the plain and ordinary meaning of the word in the context of the claims, a POSITA would have understood that “undermold” in the claims meant a “material molded over a piece or part that seals against environmental factors and is surrounded by an

‘overmold’.” EX1001, generally, FIGS. 48, 54, 55, 60; *Decl.*, ¶[143].

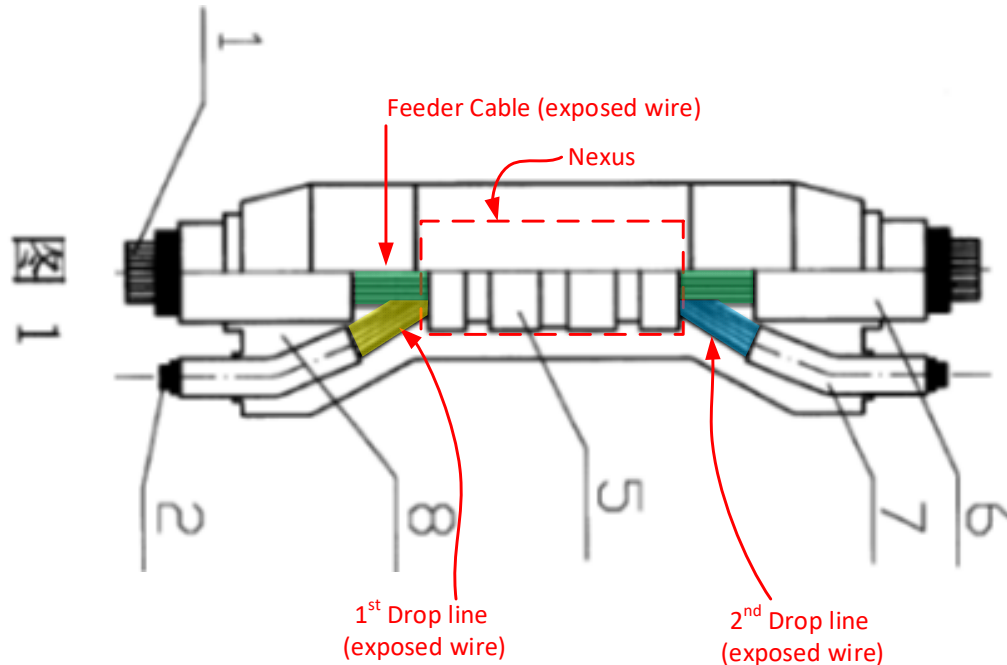
Amphenol discloses various diversity junctions (i.e., undermolds) that are molded to fully encase the union of the various wires at a nexus. EX1007, p.5, bottom image; *Decl.*, ¶[144]. A POSITA would understand that each diversity junction (i.e., undermold) disclosed by Amphenol could provide a substrate for an overmold. *Decl.*, ¶[144].

Cable Assy and Diversity Junctions



EX1007, p.5, bottom image

Shao discloses a feeder cable’s electrical coupling to drop lines at a nexus that is covered by a sheath of injection molding material, which is an undermold that fully encases the nexus. EX1008, 5:16-20; *Decl.*, ¶[146]. Shao discloses an undermold (connector outer sheath 8) that is formed by injection molding to enclose and protect the C-shaped clamp that crimps the cable and drop lines together. *Id.*, 6:22-28, FIG. 1; *Decl.*, ¶[146].



EX1008, FIG. 1 (1st-annotation)

The protective outer sheath taught by Shao encloses the insulation sheaths on the main cable and drop lines and includes inner and outer surfaces extending in a longitudinal direction of the feeder cable. *Decl.*, ¶[146].

It would have been obvious to a POSITA to use the undermold taught by Shao to encase the exposed cables and the clamp holding together the feeder and branch cables of Amphenol to better protect those elements from damage and/or exposure. *Decl.*, ¶¶[90]-[108],[147]-[148].

Thus, limitation 1(D) is disclosed by the Amphenol-Shao combination.

1(D)(i)

1(D)(i)(1) “Said Inner Surface”

Applying antecedent basis rules, the expression “said inner surface,” recited

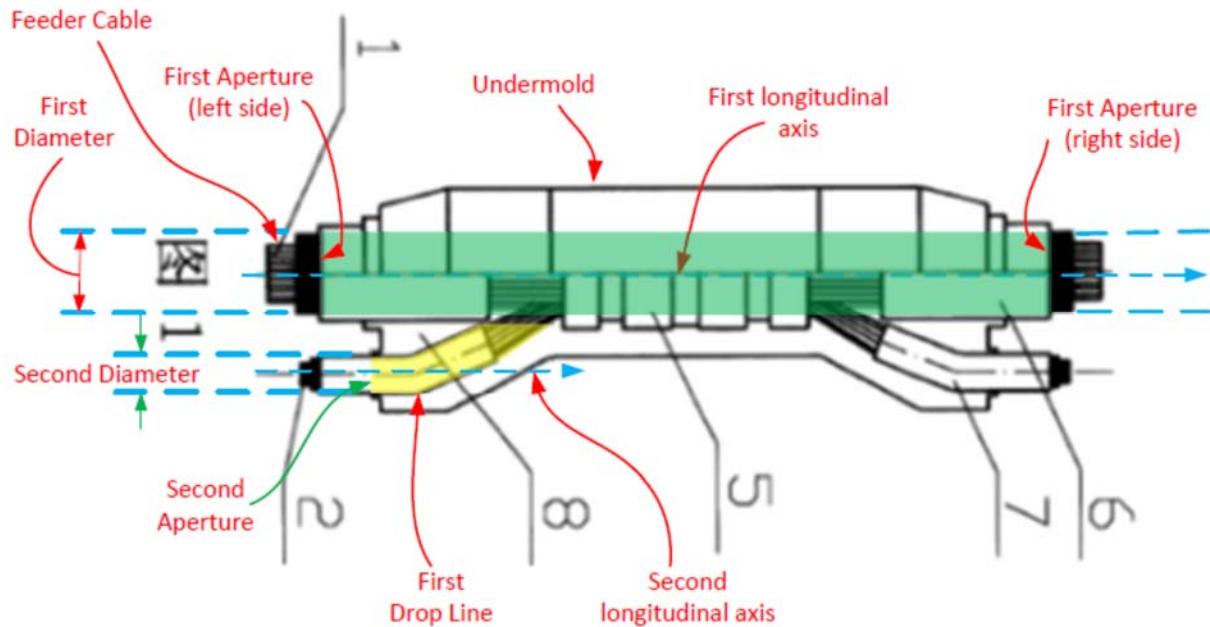
in limitation 1(D)(i) refers to the earlier recitation of “[a]n undermold having an inner surface,” recited in limitation 1(D). The ‘254 Patent specification does provide details regarding the inner surface of the undermold (22) or define “aperture.” EX1001, generally; *Decl.*, ¶[150]. Per Petitioner’s proposed claim construction, the first aperture should be understood to be the three-dimensional hole extending through the axial ends of the undermold (22), including the passage extending therebetween. EX1017, p.39; *Decl.*, ¶[150]. Thus, “said inner surface comprised of a first aperture” refers to the passage that extends completely through the undermold (22) in the longitudinal direction. EX1001, generally; *Decl.*, ¶[150]. Shoa’s FIG. 1 above discloses this geometric feature.

1(D)(i)(2) “Concentric”

The term “concentric” as used in claim 1 should be interpreted as meaning “substantially concentric” as the connection geometries disclosed in the ‘254 Patent are not perfectly concentric. *Decl.*, ¶[151]. For example, FIG. 7 shows that the securing means (20) surrounds the drop line (12) making it off center of the feeder cable. EX1001, FIG. 7; *Decl.*, ¶[152].

Shao discloses an undermold (i.e., connector outer sheath 8) that includes an inner surface defined by a first aperture that extends in the longitudinal direction of the feeder cable (i.e., the direction of trunk conductor 1) and that is substantially concentric with the securing means (i.e., C-shaped clamp 5) and the feeder cable.

EX1008, FIG. 1; *Decl.*, ¶[153].



EX1008, FIG. 1 (2nd-annotation)

Also, in Shao the first aperture extends continuously through the undermold (i.e., connector outer sheath 8) in the longitudinal direction and has a first diameter. EX1008, FIG. 1; *Decl.*, ¶[153].

It would have been obvious to a POSITA to use an undermold as taught by Shao (i.e., a connector outer sheath) to encase the exposed cables and the clamp holding feeder and branch cables together to protect those elements from damage and/or exposure. *Decl.*, ¶¶[90]-[108],[154].

Thus, limitation 1(D)(i) is disclosed by the Amphenol-Shao combination.

1(D)(ii)

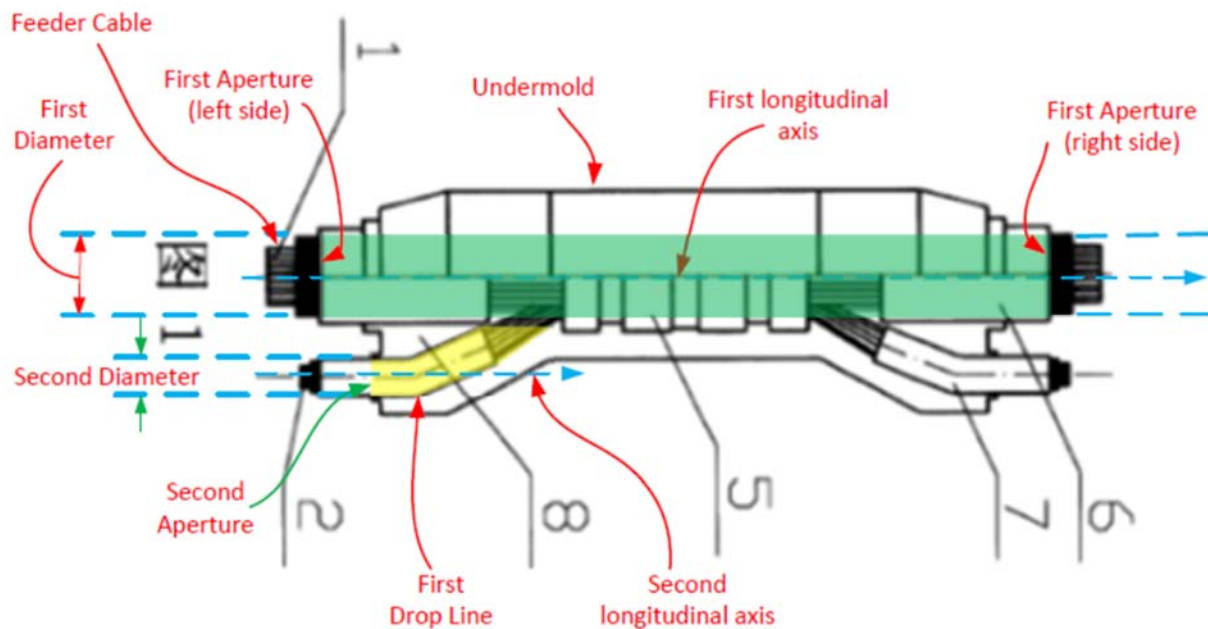
Shao discloses a feeder cable (i.e., trunk conductor 1) continuously extending through the first aperture. EX1008, FIG. 1; *Decl.*, ¶[156]. It would

have been obvious to a POSITA to use the configuration of one continuous feeder cable and the associated aperture in the undermold, as taught by Shao, since it is the most natural arrangement of wiring elements. *Id.* Additionally, a POSITA would understand that using the cable junction design of Shao would increase reliability, improved resistance to environmental factors, provide a low profile installation configuration, and would be easy to install. *Decl.*, ¶¶[90]-[108],[156].

Thus, limitation 1(D)(ii) is disclosed by the Amphenol-Shao combination.

1(D)(iii)

Shao discloses a second aperture concentric with said first drop line (i.e., the branch line conductor 3) and parallel to said first aperture. EX1008, FIG. 1; *Decl.*, ¶[158].



EX1008, FIG. 1 (2nd-annotation)

FIG. 1 of Shao shows that the second aperture only partially extends through

the undermold in the longitudinal direction, while also having a second diameter that is smaller than the first diameter of the first aperture and having the first drop line extend therefrom. EX1008, FIG. 1; *Decl.*, ¶[159]. Shao describes “[o]ne trunk conductor and two branch-line conductors are symmetrically overlapped and crimped by means of the K-shaped branch connector 5 to form one joint and two branch- line conductor out-leads.” *Id.*, 6:18-22. This description in Shao indicates that there is a single trunk conductor extending all the way through the junction. This description also indicates there are two branch line conductors that are separate cables prior to the assembly that are symmetrically overlapped and crimped to the trunk. *Id.*; *Decl.*, ¶[159]. Specifically, this process begins with three elements (“one trunk conductor and two branch-line conductors”), with the two branch line conductors similar to the two drop lines of the ’254 Patent. *Id.* Upon assembly, each of the drop lines (branch line conductors) begins within the nexus (crimp) and extends outward through the undermold (e.g., outer sheath 8). *Id.* Apertures are formed by the cables extending completely through the undermold, and by the conductors extending partially through the undermold from the nexus as shown in FIG. 1. *Id.*

Shao also discloses that the trunk conductor has a first diameter, and the branch line conductors have a second diameter that is smaller than the first diameter, and that the apertures associated with the trunk conductor has a first

diameter. *Decl.*, ¶[160]. Thus, the aperture associated with the branch lines has a smaller diameter. *Id.* Also, FIG. 1 shows that the apertures are parallel to each other. *Id.*

It would have been obvious to a POSITA to use an undermold (i.e., outer sheath 8), as taught by Shao to encase the exposed cables and the clamp holding the feeder and drop lines (i.e., trunk conductor and branch line conductor) together to better protect those elements from damage and/or exposure. *Decl.*, ¶¶[90]-[108],[161].

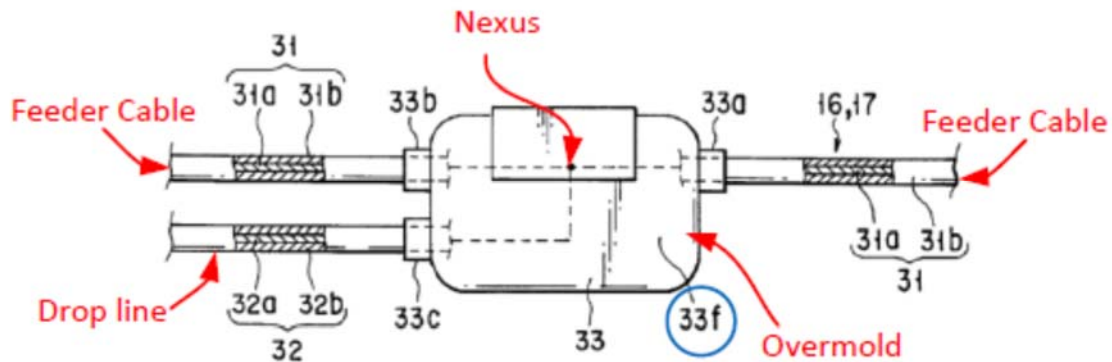
Thus, limitation 1(D)(iii) is disclosed by the Amphenol-Shao combination.

1(E)

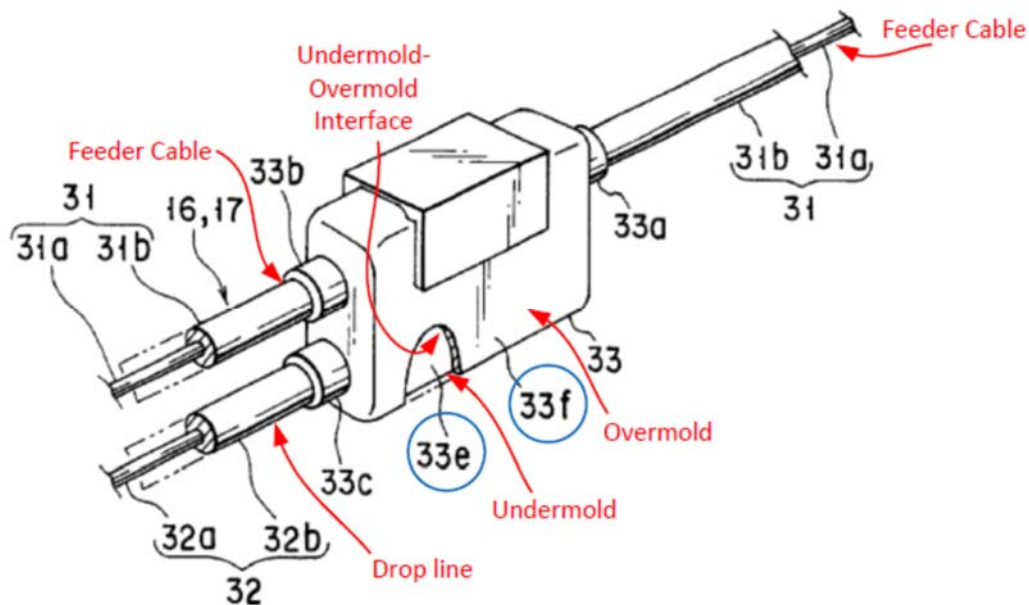
Applying antecedent basis rules, “said outer surface” in limitation 1(E) refers to “an undermold having an inner surface and an outer surface” recited in limitation 1(D). A POSITA would understand “only” in “forming an undermold-overmold interface *only at* said outer surface,” as recited in limitation 1(E), to refer to the undermold-overmold interface existing between the overmold and only the outer surface of the undermold, as opposed to the inner surface of the undermold. *Decl.*, ¶[163].

Yamawaki teaches applying an overmold over an undermold of branch cable connections to provide an added layer of waterproofing. EX1006, 10:19-22; 13:15-18; *Decl.*, ¶[164]. In particular, Yamawaki discloses applying a covering

member 33f (overmold) over the molded underbody 33e (undermold) covering a branch junction (i.e., a nexus) of cables (a feeder cable and a branch cable). *Id.*, FIGS. 9A, 9B; *Decl.*, ¶[164].



EX1006, FIG. 9A (1st-annotation)



EX1006, FIG. 9B (1st-annotation)

Shao and Yamawaki describe methods for encasing cable junctions within insulating layers to protect against environmental factors. Yamawaki provides

greater protections for cable junctions as well as other benefits. *Decl.*, ¶¶[109]-[126],[166]. A POSITA would have found it obvious to add an overmold as taught by Yamawaki to the Amphenol-Shao combination to provide added protections (e.g., waterproofing) against environmental elements. *Id.*

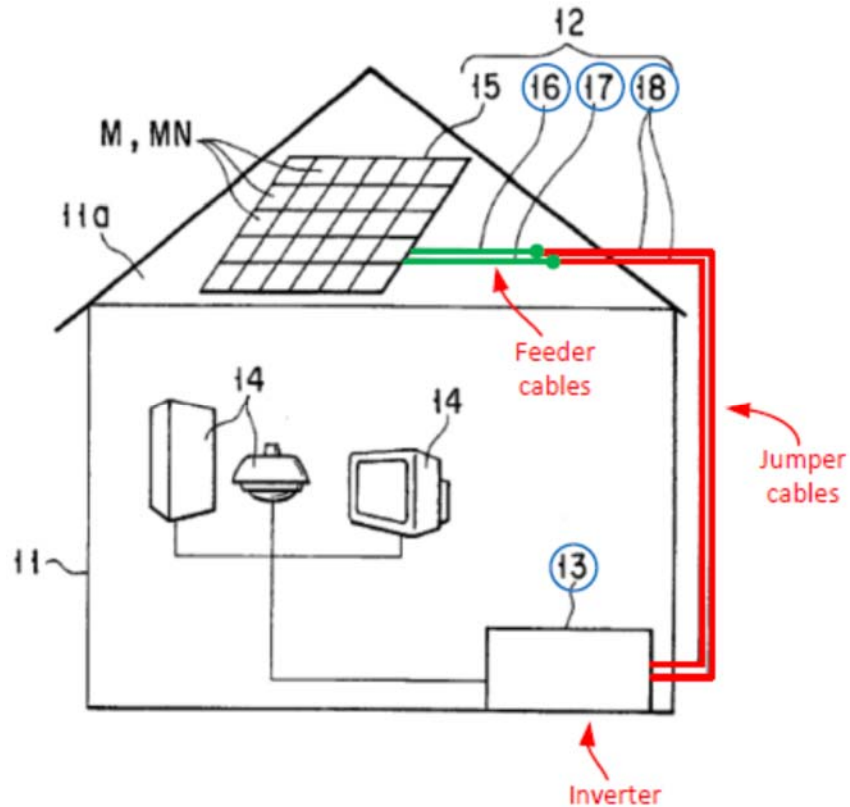
Thus, limitation 1(E) is disclosed by the Amphenol-Shao-Yamawaki combination.

1(E)(i)

In the 05/30/2017 Office Action, the Examiner found that the limitation “the lead assembly combines power from a plurality of solar arrays and transmits that power to an inverter in a solar energy installation lacking a combiner box between the solar arrays and the inverter” is an intended use limitation. EX1002, pp.259-260. The Federal Circuit has held that “where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on.” *In re Swinehart*, 439 F.2d at 213, 169 USPQ at 228. Applicant did not challenge or rebut this assertion by the Examiner. *Id.*, pp.239-250.

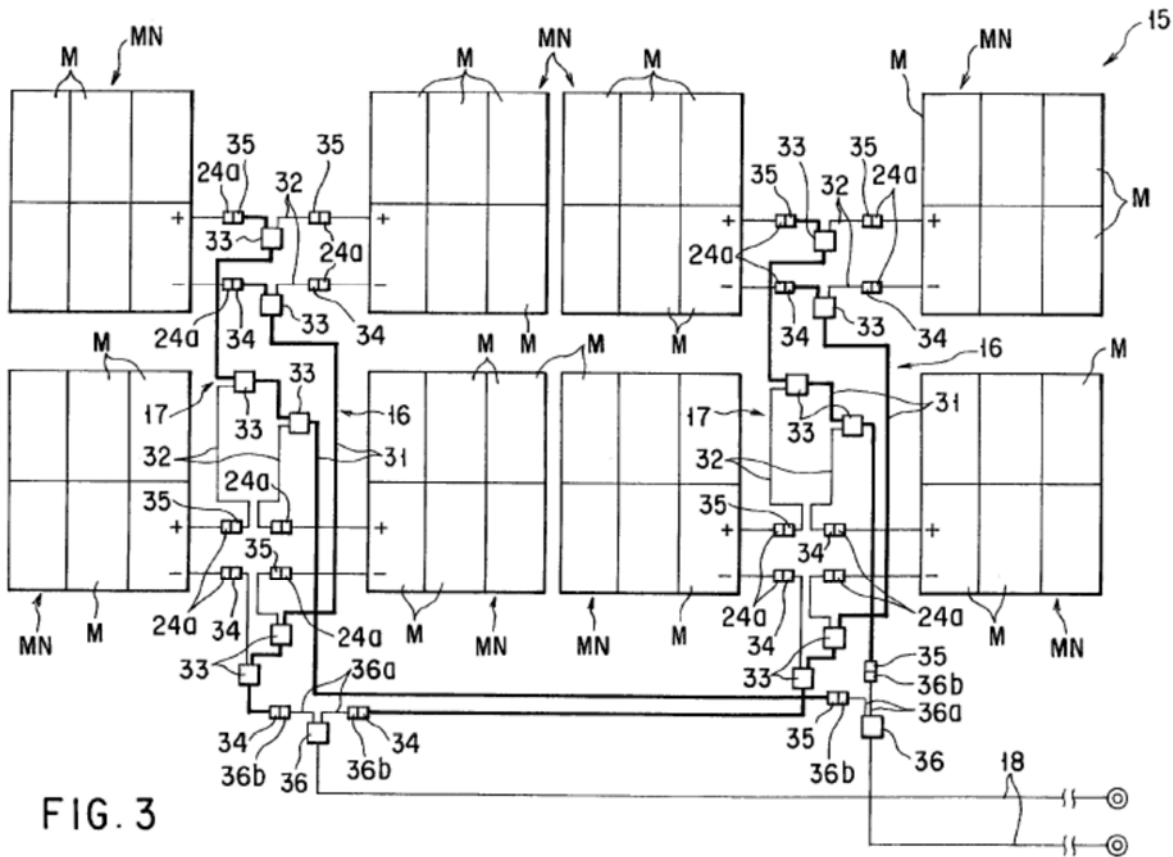
Where the claimed and prior art products are identical or substantially identical in structure or composition ... a prima facie case of either anticipation or

obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). Amphenol discloses that lead assemblies combine power from multiple solar arrays. EX1007, p.6; *Decl.*, ¶[169]. A POSITA would recognize that the Photovoltaic Interconnections System of Amphenol is configured to combine power from solar arrays and transmit that power to an inverter in a solar installation lacking a combiner box therebetween. *Decl.*, ¶[169]. Yamawaki's FIG. 1 discloses solar arrays with cables connected directly to an inverter without use of a combiner box. EX1006, FIG. 1; *Decl.*, ¶[171]. A POSITA familiar with the challenges of routing many separate wires to a distant junction, such as a connector box, would be motivated to combine Amphenol as modified by Shao with the teachings from Yamawaki to achieve the benefits of a system of multiple drop lines connected to feeder cables that feed directly to the inverter. *Decl.*, ¶[171].



EX1006, FIG. 1 (1st-annotation)

Yamawaki's FIG. 3 shows an installation with 8 separate solar module units MN, each consisting of a plurality of solar modules M. EX1006, FIG. 3 (below); *Decl.*, ¶[172]. Yamawaki's FIG. 1 shows that power is gathered through cables and junctions that are combined to form a single pair of lead-in wires 18 that are connected directly to an inverter. EX1006, 8:1-11, FIG. 1; *Decl.* ¶[172].



EX1006, FIG. 3

The resulting system would avoid problems described by Yamawaki by relying on branch cables connected to trunk cables in a simplified system that directs power from solar arrays directly to the inverter without intervening combiner boxes. *Decl.*, ¶[173]. A POSITA would have been motivated to combine/route power from many solar arrays to an inverter, as taught by Yamawaki, to provide a simplified system that is easier to install and more reliable. *Decl.*, ¶¶[109]-[126],[173]. The assortment of cables, connectors, junctions, and other elements disclosed by Amphenol provide the basic structures for such a system, and Shao's improved manufacturing designs and methods would enhance

the performance and reliability of cable junctions in these systems. *Decl.*, ¶[173].

Thus, limitation 1(E)(i) is disclosed by the Amphenol-Shao-Yamawaki combination.

1(E)(ii)

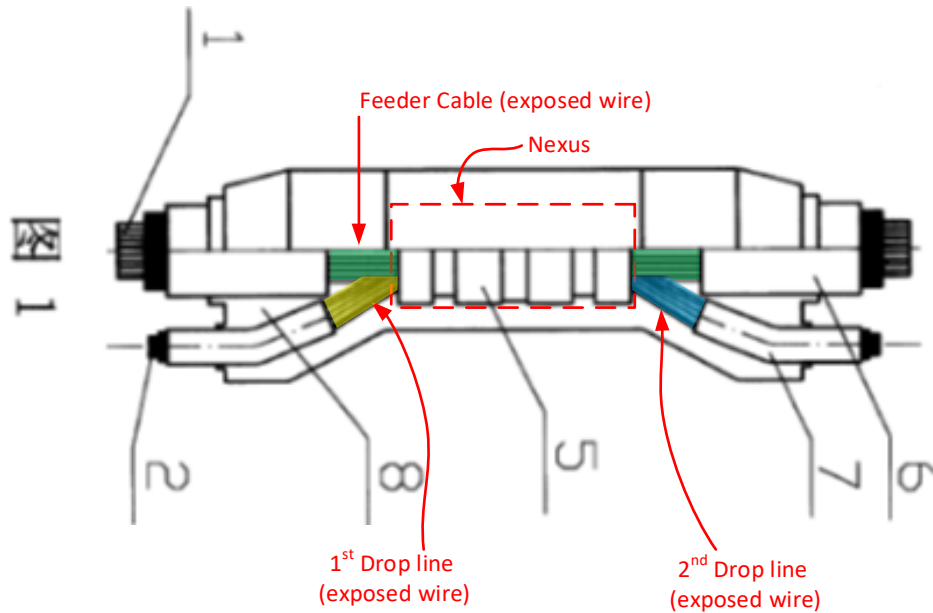
Amphenol discloses lead assemblies with a voltage rating of 1500 VDC (i.e., between 600VDC and 2000VDC). EX1007, p.21(top); *Decl.*, ¶[175].

Thus, limitation 1(E)(ii) is disclosed by Amphenol.

Therefore, claim 1 is obvious based on the Amphenol-Shao-Yamawaki combination. *Decl.* ¶[176].

2. Claim 2

Shao discloses that the first drop line includes a section of exposed wire (colored yellow in FIG. 1 below) at the nexus. EX1008, ¶28 and FIG. 1; *Decl.*, ¶[177]. Shao discloses that “[o]ne trunk conductor and two branch-line conductors are symmetrically overlapped and crimped by means of the K-shaped branch connector 5 to form one joint and two branch-line conductor out-leads, and directions of the branch-line conductor out-leads are opposite.” EX1008, 6:18-22; *Decl.*, ¶[177].



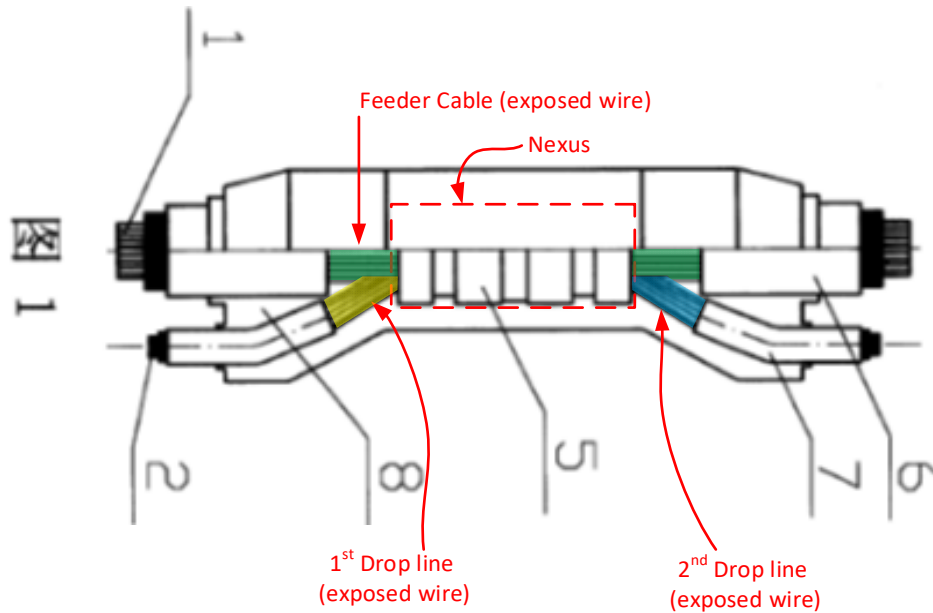
EX1008, FIG. 1 (1st-annotation)

It would have been obvious to a POSITA to expose wires, such as the drop line wires and the feeder cable wire at a nexus, as taught by Shao, to apply a crimped C-shaped clamp that ensures contact is maintained between the two conductive elements. EX1008, 6:18-22; *Decl.*, ¶¶[90]-[108],[178].

Thus, claim 2 is obvious based on the Amphenol-Shao-Yamawaki combination.

3. Claim 3

Shao discloses that feeder cables include a section of exposed wire (green) at the nexus. EX1008, FIG. 1; *Decl.*, ¶[180]. Shao discloses that the cable of the trunk conductor 1 and the branch conductors 2 are secured by a C-shaped clamp that crimps the conductors together and forms the nexus. *Decl.*, ¶[180].



EX1008, FIG. 1 (1st-annotation)

It would have been obvious to a POSITA to expose wires, such as drop line wires and the feeder cable wire at a nexus as taught by Shao, to apply a crimped C-shaped clamp maintain contact between the two conductive elements. EX1008, 6:18-22; *Decl.*, ¶[181].

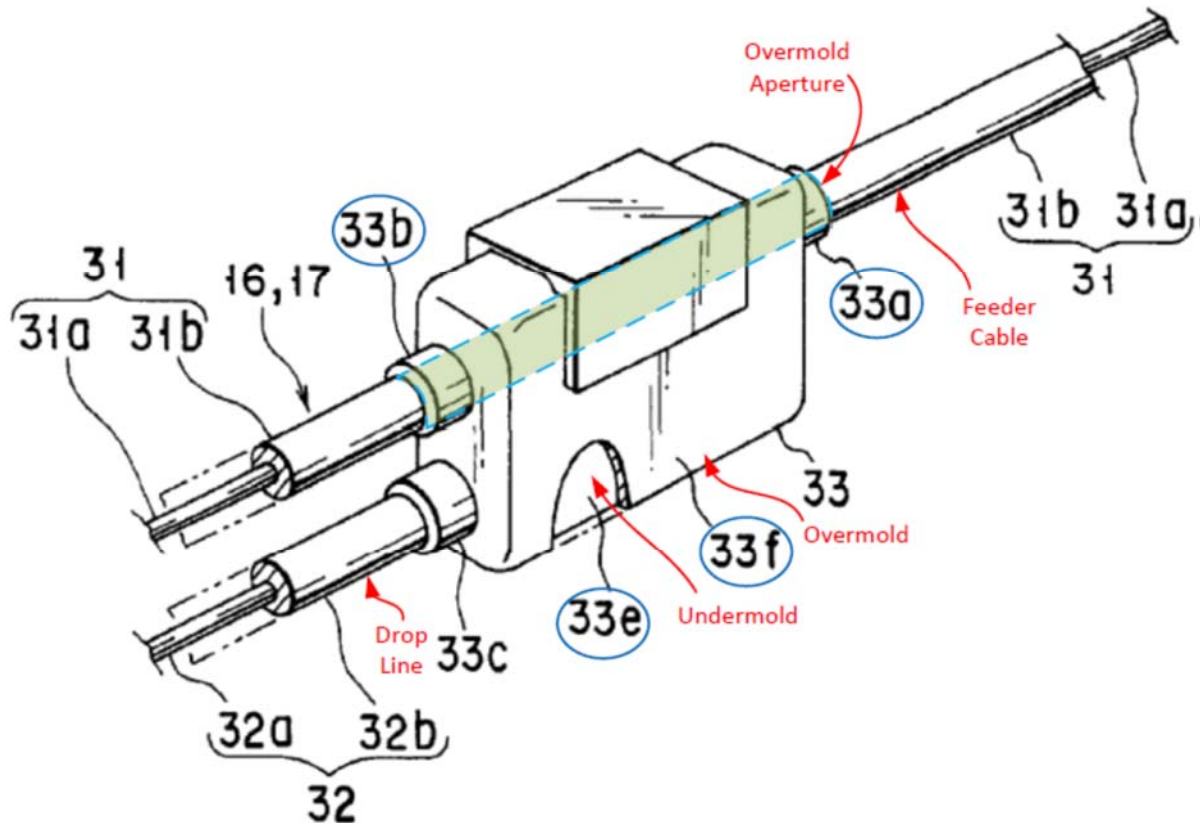
Thus, claim 3 is obvious based on the Amphenol-Shao-Yamawaki combination.

4. Claim 4

See limitation 1(D)(i) regarding “aperture.” *Decl.*, ¶[150].

Yamawaki FIG. 9B shows that the overmold (i.e., the cover member 33f covering the molded body 33e) defines at least one aperture (e.g., green) around the feeder cable that extends from a cylindrical trunk cable connecting portion 33a on one side to another cylindrical trunk cable connecting portion 33b on the

opposed side. EX1006, col. 10, lines 19-27 and FIG. 9B; *Decl.*, ¶[183].



EX1006, FIG. 9B (2nd-annotation)

It would have been obvious to a POSITA to use an overmold (i.e., the cover member 33f) forming an aperture defined by the feeder cable, as taught by Yamawaki, to encase the assembly and protect the underlying elements from water intrusion and improve reliability. *Decl.*, ¶¶[109]-[126],[184].

Thus, claim 4 is obvious based on the Amphenol-Shao-Yamawaki combination.

5. Claim 5

Shao discloses a feeder cable electrically coupling to drop lines at a nexus

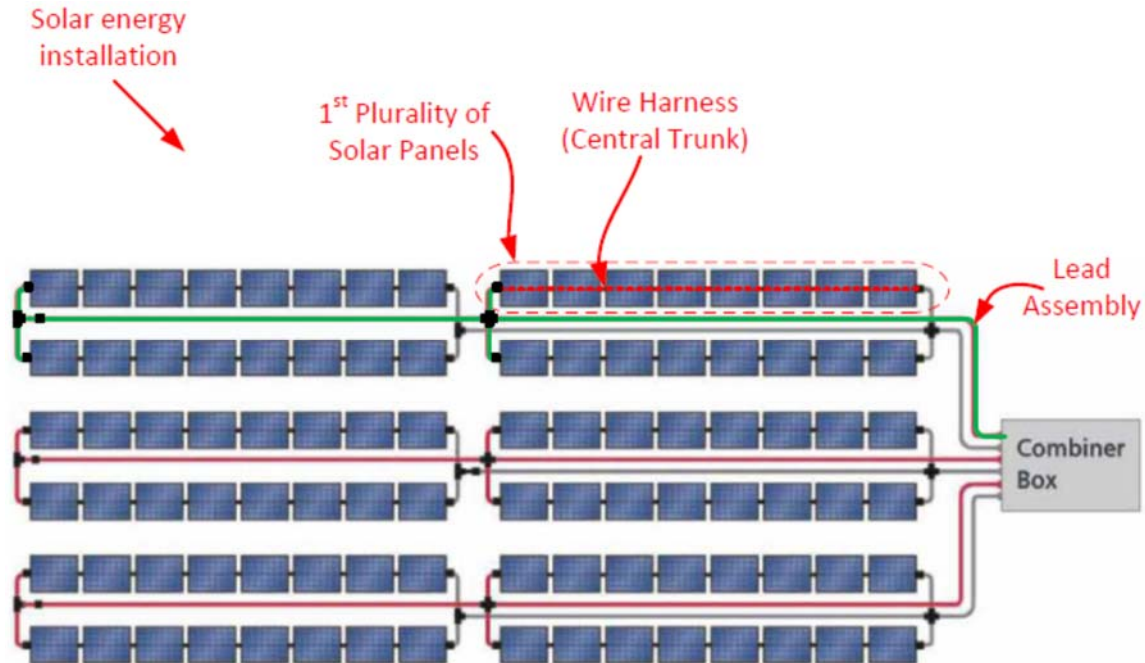
that is covered by a sheath made of injection molding material, forming an undermold that fully encases the nexus. EX1008, 5:16-20; *Decl.*, ¶[186]. A POSITA would have been motivated to better protect the exposed cables and the metal clamp holding them together from damage and/or exposure by encasing them in an injection molded sheath (i.e., an undermold) as taught by Shao. *Decl.*, ¶¶[90]-[108],[186].

Thus, claim 5 is obvious based on the Amphenol-Shao-Yamawaki combination.

6. Claim 7

7(Preamble)

Amphenol discloses a solar power system (i.e., a solar energy installation). EX1007, p.6, middle image; *Decl.*, ¶[188].



EX1007, p.6, middle image (1st-annotation)

Thus, limitation 7(Preamble) is disclosed by Amphenol.

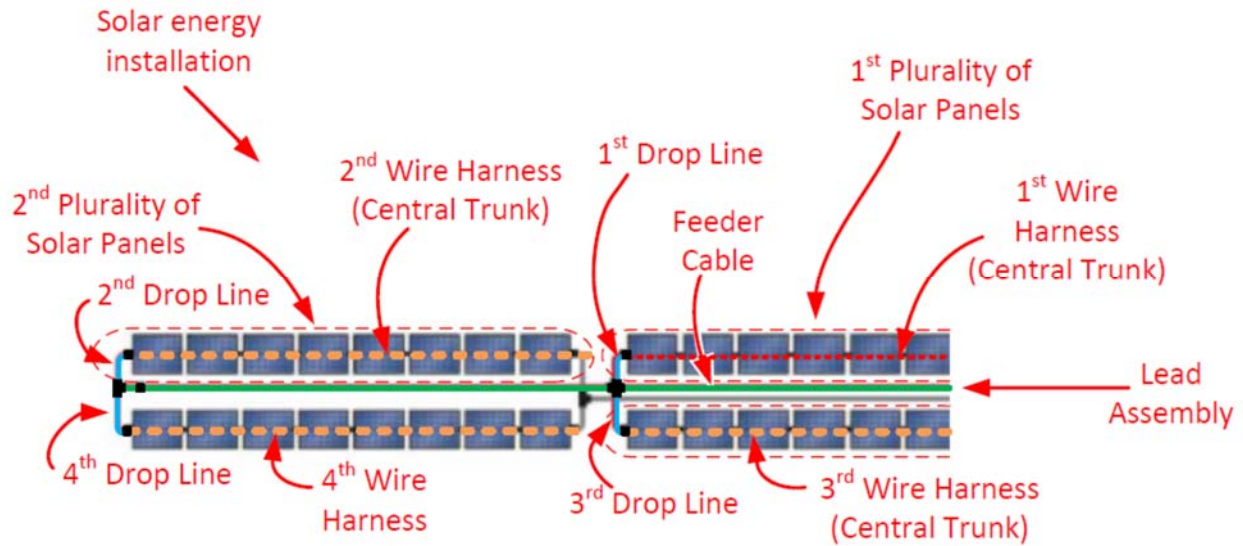
7(A)

Amphenol discloses a first plurality of solar panels (red dotted line oblong circle) electrically coupled by a first wire harness (dotted red line) to form a first solar array. EX1007, p.6, middle image; *Decl.*, ¶[190].

Thus, limitation 7(A) is disclosed by Amphenol.

7(B)

Amphenol further discloses several other sets of solar panels (red dotted line oblong circles), which are each multiple solar panels, that are each electrically coupled by a second wire harness (orange dotted line) to form a second solar array. EX1007, p.6, middle image; *Decl.*, ¶[192].



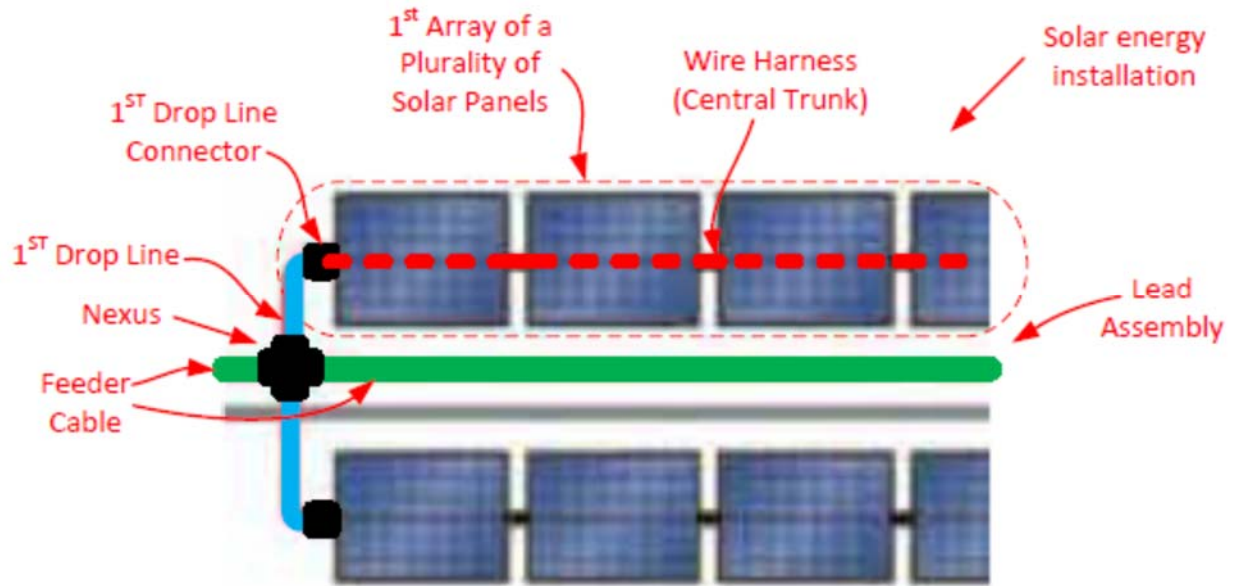
EX1007, p.6, middle image (Relief & 2nd-annotation)

Thus, limitation 7(B) is disclosed by Amphenol.

7(C)

7(C)(i)

Amphenol discloses a **lead assembly** with a **first drop line** electrically connected to the **first wire harness**. EX1007, p.6, middle image; *Decl.*, ¶[194].



EX1007, p.6, middle image (Relief & 3rd-annotation)

Thus, limitation 7(C)(i) is disclosed by Amphenol.

7(C)(ii)

See limitation 1(B) (i.e., 30 amp feeder cable) and limitation 1(E)(i) (i.e., connection to inverter). *Decl.*, ¶¶[135],[136],[168]-[173],[196].

Thus, limitation 7(C)(ii) is disclosed by the Amphenol-Shao-Yamawaki combination.

7(C)(iii)-(ix)

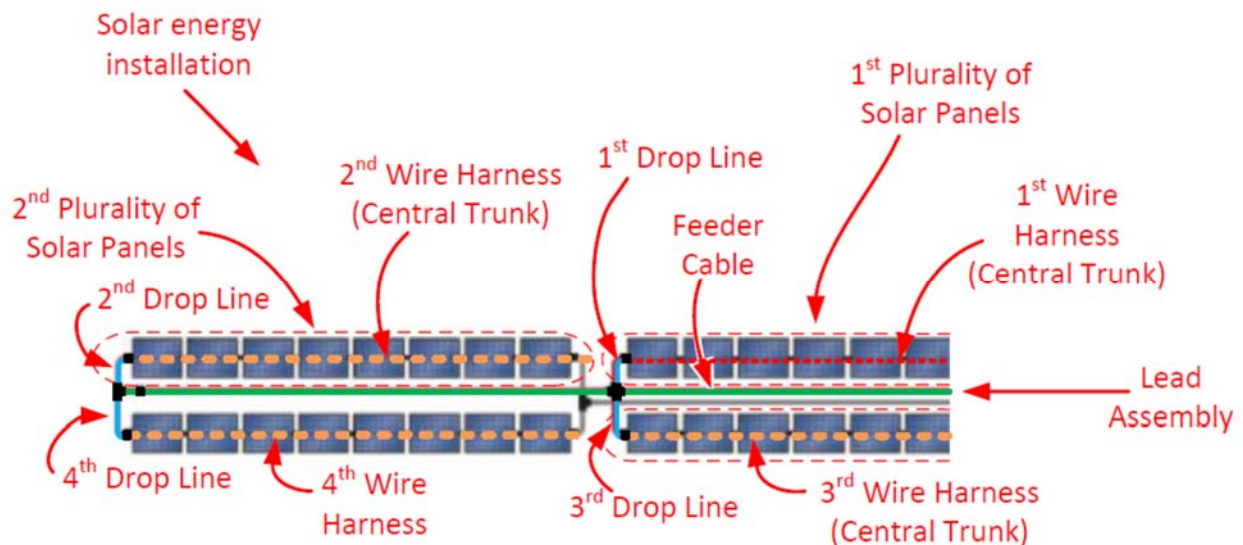
See limitation 1(B-E). Regarding the recitation of a “compression lug” in limitation 7(C)(iii, iv, v), as opposed to the crimped C-shaped clamp discussed above regarding limitation 1(C), a POSITA would understand that the selection of a C-shaped clamp over a compression lug is a matter of design choice. *Decl.*, ¶[198].

Thus, limitations 7(C)(iii-ix) are disclosed by the Amphenol-Shao-

Yamawaki combination.

7(D)

Amphenol discloses a **second drop line** electrically connected to the **second wire harness**. EX1007, p.6, middle image; *Decl.*, ¶[200].

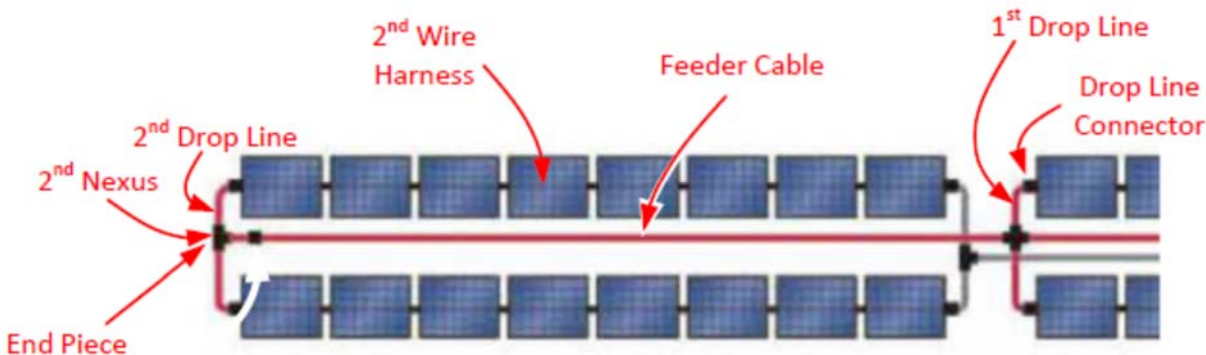


EX1007, p.6, middle image (Relief & 4th-annotation)

Thus, limitation 7(D) is disclosed by Amphenol.

7(D)(i)

Amphenol discloses that the second drop line is electrically connected to the feeder cable at a second nexus. EX1007, p.6, middle image; *Decl.*, ¶[202].



EX1007, p.6, middle image (Relief and 5th-annotation)

Thus, limitation 7(D)(i) is disclosed by Amphenol.

7(D)(ii)

See limitation 1(E)(i). Regarding the expression “upstream of said component,” a POSITA would understand this refers to locations between the component and the solar panels of the installation. *Decl.*, ¶[204]. The terms “upstream” and “downstream” are understood to refer to the direction of the flow of power from the solar panels to the inverter in the solar array installation. *Id.*

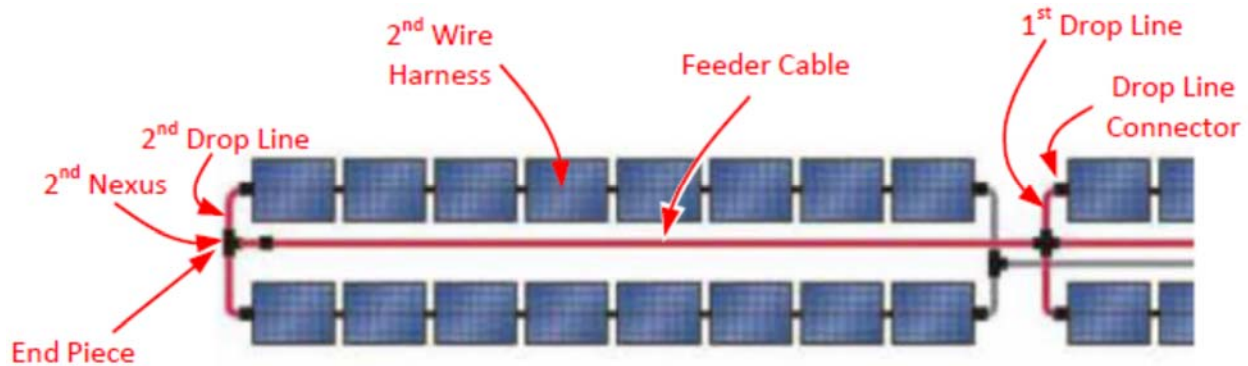
Thus, limitation 7(D)(ii) is disclosed by the Amphenol-Shao-Yamawaki combination. *Decl.*, ¶[204].

Therefore, claim 7 is obvious based on the Amphenol-Shao-Yamawaki combination.

7. Claim 8

Amphenol discloses that the lead assembly includes an end piece (e.g., the

second nexus is an end piece). EX1007, p.6, middle image; *Decl.*, ¶[206].



EX1007, p.6, middle image (Relief & 5th-annotation)

Thus, claim 8 is obvious based on the Amphenol-Shao-Yamawaki combination.

8. Claim 9

Amphenol discloses that the first drop line (i.e., branch) terminates in a drop line connector. EX1007, p.6, middle image; *Decl.*, ¶[208].

Thus, claim 9 is obvious based on the Amphenol-Shao-Yamawaki combination.

9. Claim 10

See limitation 1(B). *Decl.*, ¶¶[135]-[138], [210].

10. Claim 11

Amphenol discloses a list of gauges for the drop lines (i.e., the branch cable) that may be selected for a lead assembly, including 8AWG, 10AWG, 12AWG, or 14AWG, demonstrating this selection is a design choice. EX1007, p.21 (Branch cable size list); *Decl.*, ¶[212].

Thus, claim 11 is obvious based on the Amphenol-Shao-Yamawaki combination.

11. Claim 12

Amphenol discloses a list of gauges for the feeder cables (i.e., the Main cable) that may be selected for a lead assembly, including 8AWG, 10AWG, 12AWG, or 14AWG, demonstrating this selection is a design choice. EX1007, p.21 (Main cable size list); *Decl.*, ¶¶[214]]-[216]; EX1010, generally.

Thus, claim 12 is obvious based on the Amphenol-Shao-Yamawaki combination.

12. Claim 13

See limitation 1(C) and limitation 7(C)(iii). *Decl.*, ¶¶[141],[198].

13. Claim 14

14(Preamble)

See limitation 7(Preamble). A POSITA would have found the limitations in limitation 14(Preamble) to be obvious in view of Amphenol disclosing limitation 7(Preamble) and thus illustrating that those elements must be constructed to form a solar power installation. *Decl.*, ¶[219].

Thus, limitation 14(Preamble) is disclosed by Amphenol.

14(A)

See limitation 7(A). A POSITA would have found the limitations in limitation 14(A) to be obvious in view of Amphenol disclosing limitation 7(A)

thus illustrating that those elements must be connected. *Decl.*, ¶[221].

14(B)

See limitation 7(C)(i). A POSITA would have found the limitations in limitation 14(A) to be obvious in view of Amphenol disclosing limitation 7(B) thus illustrating that those elements must be connected. *Decl.*, ¶[223].

14(C)

See limitation 7(B). A POSITA would have found the limitations in limitation 14(A) to be obvious in view of Amphenol disclosing limitation 7(C) thus illustrating that those elements must be connected. *Decl.*, ¶[225].

14(D)

See limitation 7(D). A POSITA would have found the limitations in limitation 14(A) to be obvious in view of Amphenol disclosing limitation 7(D) thus illustrating that those elements must be connected. *Decl.*, ¶[227].

14(E)

See limitation 1(E)(i). A POSITA would have found the limitations in limitation 14(E) is disclosed by Amphenol, Shao, and Yamawaki by disclosing all the elements and thus disclosing those elements may be connected. *Decl.*, ¶[229].

14(E)(i)-(iii)

See claim 1. *Decl.*, ¶[231].

Therefore, claim 14 is obvious based on the Amphenol-Shao-Yamawaki

combination.

14. Claim 15

See limitation 1(E)(i) and limitation 7(C)(ii). *Decl.*, ¶¶[168]-[173],[196],[233].

B. Ground 2: Claim 6 is unpatentable under 35 U.S.C. § 103 as obvious based on Amphenol, Shao, Yamawaki, and Tamura

Motivation To Combine Amphenol, Shao, Yamawaki, and Tamura

As shown in Ground 1, a POSITA would be motivated to combine Amphenol, Shao, and Yamawaki. *See supra* pp. 12-15; *Decl.*, ¶¶[90]-[126]. In addition, a POSITA would have been motivated to modify the Amphenol-Shao-Yamawaki combination with teachings of Tamura (i.e., the “Amphenol-Shao-Yamawaki-Tamura combination”). *Decl.*, ¶[236].

Amphenol, Shao, Yamawaki, and Tamura are analogous prior art in the same field of electrical wiring assemblies and connectors as the '254 Patent. *Decl.*, ¶[239]. As described in Ground 1, the Amphenol-Shao-Yamawaki combination discloses a variety of cable junction geometries for solar power wiring assemblies, manufacturing methods for joining the main cables and drop lines, and providing insulation and molding to protect the junctions, and improvements to branch junctions that include a molded body (undermold) covered by a cover member

(overmold). *Decl.*, ¶[238]. Likewise, Tamura discloses cable assemblies and a “Cable branch molding method” that provide “high waterproofing performance.” EX1009, ¶3, 17; *Decl.*, ¶[238].

Tamura discloses a 2-layer molding process for sealing wiring joints that offers better reliability and performance because of the selection of “PVC resins” for several of the layers of the assembly, and the use of an inner mold part and an outer mold part which improves adhesion and achieves a “high waterproofing performance by virtue of a double waterproofing effect.” EX1009, ¶17; *Decl.*, ¶[241]. Tamura discloses double molded branching cables for solar applications. EX1009, ¶¶24-25; *Decl.*, ¶[241]. Tamura states “[a] power cable such as a CV cable is used to connect such solar battery modules... There are problems with a structure in which the branch portion of the CV cable is molded from PVC (fig. 11) in that high waterproofing performance is not achieved because of poor adhesion between the PVC and the cable conductors,” problems that are addressed by Tamura. EX1009, ¶¶3, 5, 6; *Decl.*, ¶[241].

A POSITA would be motivated to combine the manufacturing methods of Amphenol, Shao, and Yamawaki with Tamura, particularly using the two molding steps of Tamura to further improve reliability and performance, and to use these detailed designs, processes, and materials, to build the entire catalog of wiring harness components disclosed by Amphenol. *Decl.*, ¶[242]. A POSITA would

further be motivated to combine the solar power system and connectors as taught by Amphenol and modified by Shao and Yamawaki with the multi-layered protective arrangement taught by Tamura in order to provide a compact, layered casing that better protects the solar power system branch connectors against the elements. *Decl.*, ¶[247].

A POSITA would have an expectation of success in combining the Amphenol-Shao-Yamawaki combination with the teachings of Tamura since these references complement one another and the double-molding disclosed by Tamura uses well known molding processes and materials. *Decl.*, ¶[248].

1. Claim 6

Tamura discloses adding an injection-molded outer mold part 12 (i.e., an overmold) over an inner mold part 11 (i.e., an undermold). EX1009, ¶¶11,14,17; *Decl.*, ¶[252]. By using “the same resin (PVC) as that of the sheath materials 1c, 2c of the CV cable is used as the resin of the outside molded portion, which therefore also improves adhesion between the outside molded portion 12 and the sheath materials 1c, 2c,” which provides a high performance waterproofing. *Id.* It would have been obvious to a POSITA to add an injection molded overmold for added protection against environmental elements, as taught by Tamura. *Decl.*, ¶[252].

Thus, claim 6 is obvious based on the Amphenol-Shao-Yamawaki-Tamura combination.

C. Ground 3: Claims 1-15 are unpatentable under 35 U.S.C. § 103 as obvious based on Amphenol, Yu, Yamawaki, and Tamura.

Motivation to Combine Amphenol Yu, Yamawaki, and Tamura

A POSITA would have been motivated to combine the teachings of Amphenol and Yu (i.e., the “Amphenol-Yu combination”). *Decl.*, ¶[263]. Amphenol and Yu are in the same field as the ’254 Patent, and are thus analogous prior art, since both references relate to electrical wiring assemblies and connectors. *Decl.*, ¶[265]. Amphenol discloses wire assemblies, cable junctions, connectors, in-line fuses, and other components to be used for combining and distributing power from elements of a solar array installation. EX1007, generally; *Decl.*, ¶[264]. Yu discloses a detailed design of a flexible branch cable to be used for power distribution. EX1015, generally; *Decl.*, ¶[264].

A POSITA would understand that the solar power system components disclosed by Amphenol could be improved by the flexible, weather-resistant branch cable design disclosed by Yu. *Decl.*, ¶[270]. A POSITA would understand that the disclosure provided by Yu would provide methods for extending the lifetime and improving the reliability of solar system installations while preserving

the versatility and design flexibility provided by all of the system components disclosed by Amphenol. *Id.*

A POSITA would have been motivated to modify the cables, connectors, and joints of Amphenol by using the injection molding described in Yu to provide further protection for cables and connections from the environment consistent with the objectives of Amphenol. *Decl.*, ¶¶[264].

A POSITA would have an expectation of success in combining Amphenol and Yu, since the injection molding methods and materials of Yu were well understood. *Decl.*, ¶[267].

A POSITA would have been motivated to combine the teachings of Amphenol and Yu with those of Yamawaki (i.e., the “Amphenol-Yu-Yamawaki combination”). *Decl.*, ¶[276]. As explained in Grounds 1 and 2, Yamawaki discloses photovoltaic modules that may be arranged in various ways to overcome challenges and support the design of a photovoltaic panel array, including directly connecting feeder wires of a wire harness to an inverter. See EX1006, 7:54-8:11; *Decl.*, ¶[277].

Amphenol, Yu, and Yamawaki are analogous prior art because they are in the same field of power wiring assemblies and connectors as the '254 Patent. *Decl.*, ¶[277].

A POSITA would be motivated to combine the teachings of Amphenol, Yu,

and Yamawaki, including using an overmold, in the form of a cover member, over an undermold to improve reliability and performance such as the “water-resistance” as described in Yamawaki. *Decl.*, ¶[278].

A POSITA would have had an expectation of success in combining the Amphenol-Yu combination with Yamawaki because the photovoltaic modules and wiring junctions in Yamawaki are intended for use with solar installations similar to those disclosed in the Amphenol-Yu combination. *Decl.*, ¶[280].

A POSITA would have been motivated to modify the Amphenol-Yu-Yamawaki combination with the teachings of Tamura (i.e., the “Amphenol-Shao-Yamawaki-Tamura combination”). *Decl.*, ¶[281].

Amphenol, Yu, Yamawaki, and Tamura are analogous prior art because they are in the same field of electrical wiring assemblies and connectors for solar power systems. *Decl.*, ¶[284].

A POSITA would be motivated to combine the manufacturing methods of Amphenol, Yu, and Yamawaki with Tamura, particularly the simplified double molded structure taught by Tamura for insulating and protecting branch couplings against water or humidity to provide a simpler design. *See* EX1009, ¶9; *Decl.*, ¶[290],[295].

A POSITA would have an expectation of success in combining the Amphenol-Yu-Yamawaki and Tamura since the double-molding disclosed by

Tamura to provide a more simple, yet compact, layered casing that still provides protection. *Decl.*, ¶[296].

1. Claim 1

1(Preamble)

See Ground 1, limitation 1(Preamble).

1(A)

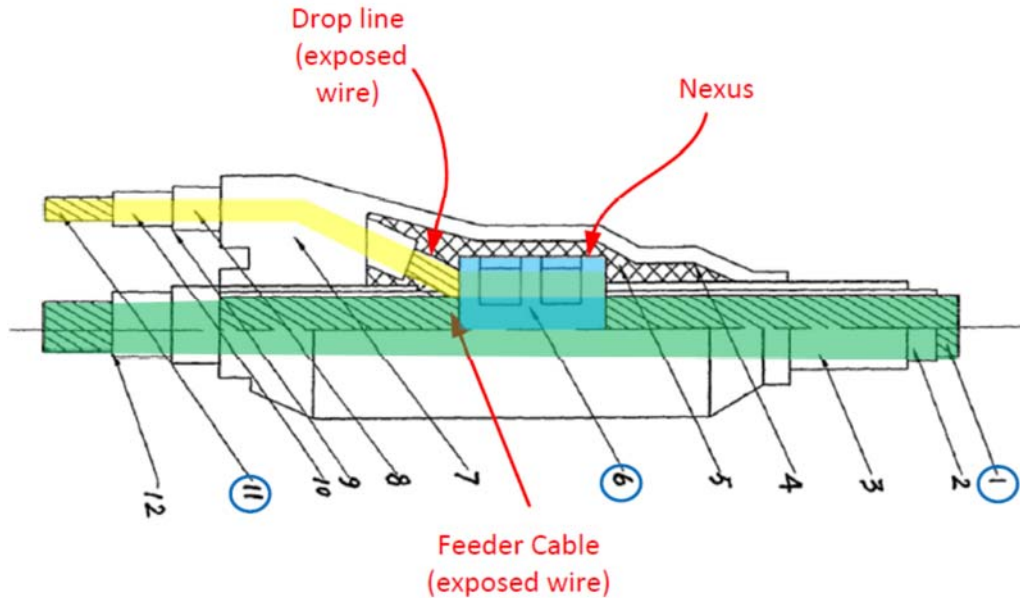
See Ground 1, limitation 1(A).

1(B)

See Ground 1, limitation 1(B).

Yu discloses details for the design and manufacture of an assembly with the feeder cable electrically coupled to the drop line at a nexus. EX1015, Abstract; *Decl.*, ¶[306]. Yu, which is in the related field of electrical connectors, discloses a feeder cable (i.e., main cable conductor 1) electrically coupled to a drop line (i.e., a branch cable conductor 11) at a nexus (i.e., a C-shaped clamp 6) that holds the feeder cable and the drop line together. EX1015, ¶7 and FIG. 1; *Decl.*, ¶[306].

Yu describes, “the main cable conductor and the branch cable conductor are crimped by means of a C-shaped clamp with a ridge by an automatic hydraulic machine.” *Id.*, 7:22-24; *Decl.*, ¶[307].



EX1008, FIG. 1 (1st-annotation)

It would have been obvious to a POSITA to use a crimped connection using a clamp as taught by Yu, to ensure contact is maintained between the conductive elements of Amphenol, which provides improved reliability. *Decl.*, ¶¶[263]-[275],[308]. Further, it would have been obvious to a POSITA to apply the same crimped connection using a clamp as taught by Yu to attach more than one branch cable. *Id.*,[308]. Thus, it would have been obvious to modify the nexus disclosed by Amphenol with the joining technique taught by Yu. *Id.* A POSITA would be motivated to combine the crimped connection using a clamp as taught by Yu with Amphenol to provide cable junctions that increase reliability, improve resistance to environmental factors, and provide a low profile installation configuration. ¶¶[263]-[275], *Decl.*, ¶[308].

Thus, limitation 1(B) is disclosed by the Amphenol-Yu combination. *Decl.*,

¶[309].

1(C)

See Ground 1, limitation 1(C) (plain and ordinary meaning of “means for securing said nexus” refers to the element or elements maintaining the strong electrical and mechanical connection between the feeder cable and the drop lines). *Decl.*, ¶¶[140],[310]. Yu provides a C-shaped clamp which is crimped to provide such a means. *Id.*

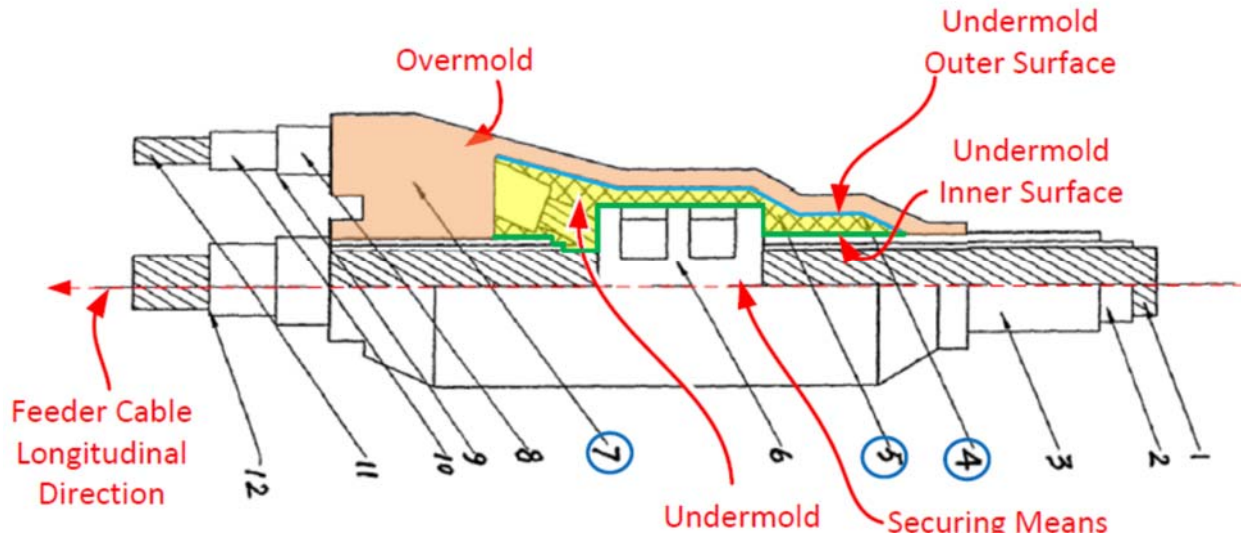
Yu discloses a feeder cable (i.e., main cable conductor 10) electrically coupled to a drop line (i.e., a branch cable conductor 11) by a C-shaped clamp (i.e., a C-shaped clamp 6), which forms a nexus that holds the feeder cable and the drop line together. EX1015, ¶7 and FIG. 1; *Decl.*, ¶[311]. As Yu describes, “the main cable conductor and the branch cable conductor are crimped by means of a C-shaped clamp with a ridge by an automatic hydraulic machine.” *Id.*, ¶4. It would have been obvious to a POSITA to use a clamp, as taught by Yu, to ensure contact is maintained between the two conductive elements. *Decl.*, ¶¶[263]-[275],[311].

Thus, limitation 1(C) is disclosed by the Amphenol-Yu combination. *Decl.*, ¶[312].

1(D)

See Ground 1, limitation 1(D) (meaning of “undermold” and that Amphenol discloses various different types of undermold). Yu, discloses an undermold (i.e., connector insulation layer 5) that fully encases the nexus, including the inner and

outer surfaces, and additional features of an electrical connector. EX1015, p.7:25-30, FIG. 1; *Decl.*, ¶[313],[314].



EX1008, FIG. 1 (2nd-annotation)

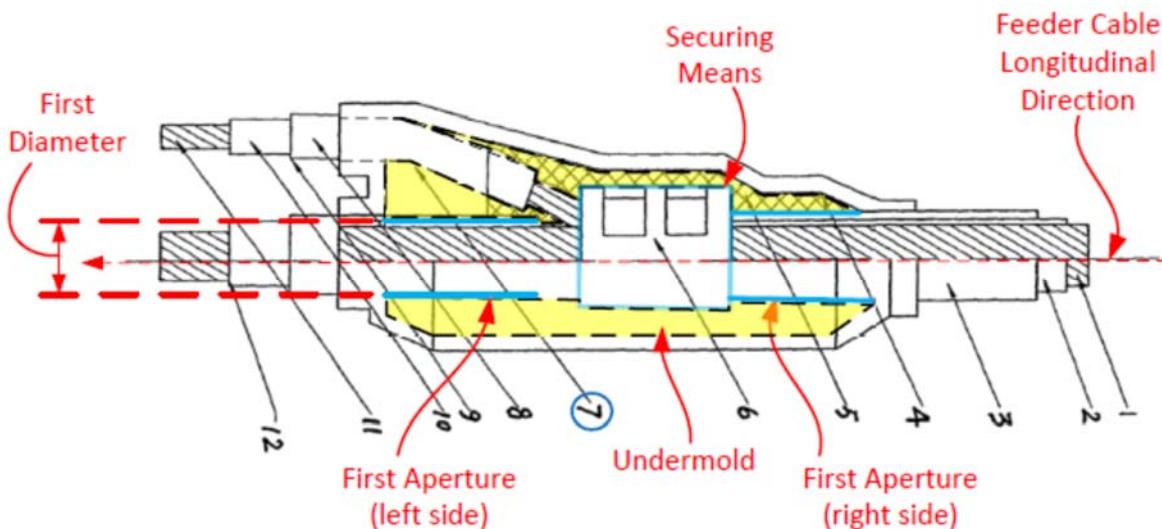
As described by Yu, “after the crimping is completed, injection molding of a connector insulation layer is performed by using a suitable mold.” EX1015, Abstract; *Decl.*, ¶[315]. Yu also discloses that the undermold (i.e., connector insulation layer 5) includes portions of inner and outer surfaces that extend in a longitudinal direction of the feeder cable, with the inner surface surrounding and fully encasing the securing means. EX1015, FIG. 1; *Decl.*, ¶[315].

It would have been obvious to a POSITA to use an undermold (i.e., a connector cover), as taught by Yu, to encase the exposed cables and the clamp holding the feeder and branch cables together and protect those elements from damage and/or exposure. ‘Motivation to Combine Amphenol and Yu,’ *Decl.*, ¶[316].

Thus, limitation 1(D) is disclosed by the Amphenol-Yu combination.

1(D)(i)

Yu discloses an undermold (i.e., connector insulation layer 5) that includes an inner surface defined by a first aperture that extends in the longitudinal direction of the feeder cable and that is substantially concentric with the securing means (C-shaped clamp 6) and the feeder cable (i.e., the main cable conductor 1). EX1015, FIG. 5; *Decl.*, ¶[318].



EX1008, FIG. 1 (3rd-annotation)

In Yu the first aperture extends continuously through the undermold (i.e., connector insulation layer 5) in the longitudinal direction and has a first diameter. EX1015, FIG. 1; *Decl.*, ¶[318].

It would have been obvious to a POSITA to use an undermold (i.e., a connector cover), as taught by Yu, to encase the exposed cables and the clamp holding the feeder and branch cables together and protect those elements from

damage and/or exposure. ‘Motivation to Combine Amphenol and Yu;’ *Decl.*, ¶[319].

Thus, the limitation 1(D)(i) is disclosed by the Amphenol-Yu combination.

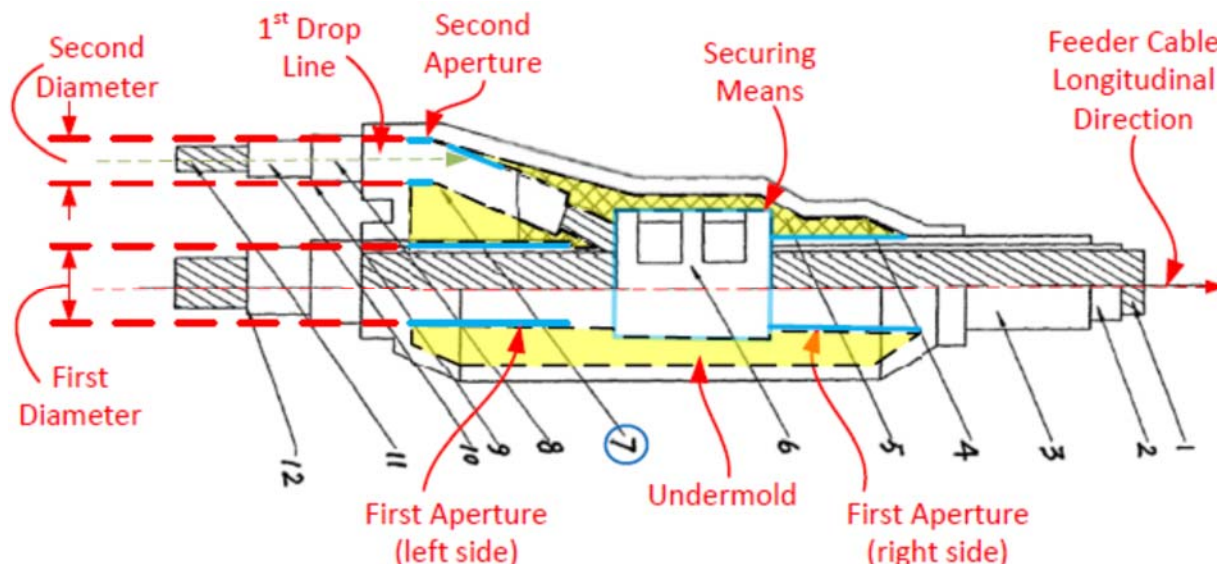
1(D)(ii)

Yu discloses a feeder cable (i.e., main cable conductor 1) continuously extending through the first aperture. EX1015, FIG. 1; *Decl.*, ¶[321]. It would have been obvious to a POSITA to use the configuration of a feeder cable and the associated aperture in the undermold, as taught by Yu, since it is the most natural arrangement of elements. *Decl.*, ¶[321]. Additionally, a POSITA would understand that using the cable junction design taught by Yu would increase reliability, improved resistance to environmental factors, and would be easy to install. ‘Motivation to Combine Amphenol and Yu;’ *Decl.*, ¶[321].

Thus, the limitation 1(D)(ii) is disclosed by the Amphenol-Yu combination.

1(D)(iii)

Yu discloses a second aperture concentric with said first drop line (i.e., the branch cable conductor 11) and parallel to said first aperture. EX1015, FIG. 1; *Decl.*, ¶[323].



EX1008, FIG. 1 (4th-annotation)

In Yu the second aperture only partially extends through the undermold in the longitudinal direction, while also having a second diameter that is smaller than the first diameter of the first aperture and having the first drop line extend therefrom. EX1015, FIG. 1; *Decl.*, ¶[323].

It would have been obvious to a POSITA to use an undermold (i.e., a connector insulation layer 5), as taught by Yu, to encase the exposed cables and the clamp holding the feeder and drop lines (i.e., branch cables) together and protect those elements from damage and/or exposure. ‘Motivation to Combine Amphenol and Yu;’ *Decl.*, ¶[324].

Thus, the limitation 1(D)(iii) is disclosed by the Amphenol-Yu combination.

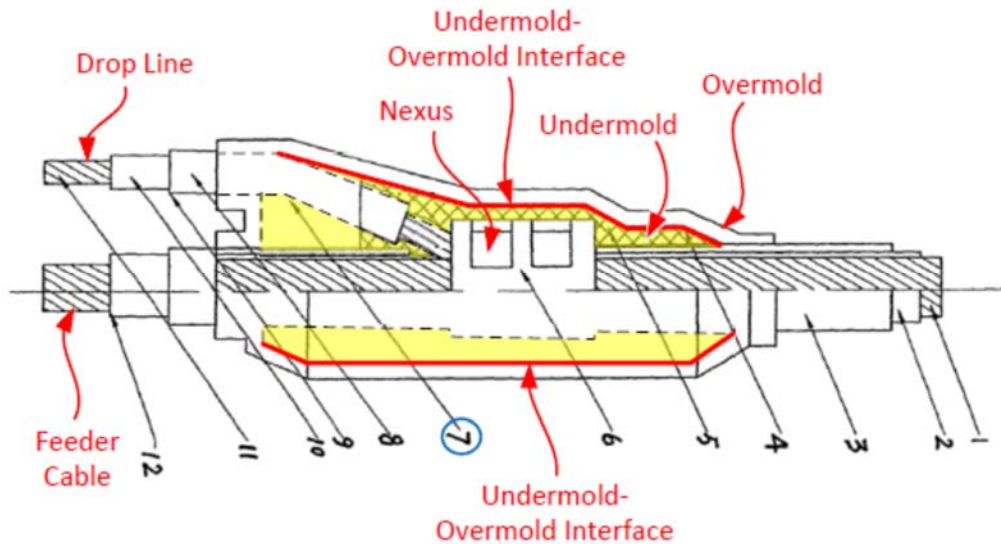
1(E)

The ’254 Patent does not define the term “undermold-overmold interface” in

“an undermold-overmold interface only at said outer surface [of said undermold],” as recited in claims 1(E), 7(C)(viii), and 14(E)(ii). EX1001, generally. A POSITA would recognize that the term could be understood as the undermold-overmold interface referring to an intermediate medium or layer between the undermold and overmold, or alternatively as the undermold-overmold interface existing between the overmold and only the outer surface of the undermold without an intermediate medium or layer therebetween. *Decl.*, ¶[326]. Yu discloses a layered configuration that meets the first interpretation of undermold-overmold interface, while Tamura discloses an alternative layered configuration that meets the second interpretation of the undermold-overmold interface. *Id.*

See Ground 1, limitation 1(E), regarding “forming an undermold-overmold interface *only at* said outer surface of the undermold.” See *supra* p. 27.

Yu discloses an undermold (connector insulation layer 5), which includes an outer surface, a portion of which extends longitudinally. EX1015, ¶5, FIG. 1; *Decl.*, ¶[328]. Additionally, Yu discloses an overmold (i.e., connector outer protective layer 7) that surrounds the undermold and forms an undermold-overmold interface only on the outer surface. *Id.*



EX1008, FIG. 1 (5th-annotation)

In Yu, the undermold-overmold interface between the undermold (i.e., the connector insulation layer 5) and the overmold (i.e., the connector outer protective layer 7) is further enhanced by providing a non-woven fabric that forms an intermediate non-woven wrapping layer 4, that is provided “to avoid adhesion between the connector insulation layer 5 and the connector outer protective layer 7.” EX1015, ¶¶9-10; *Decl.*, ¶[329]. A POSITA would understand the benefits taught by Yu of avoiding adhesion between layers including improved flexibility and better accommodation of thermal expansion/contraction differences between the layers to provide an enhanced undermold-overmold interface. *Id.*

It would have been obvious to a POSITA to use an overmold (i.e., connector outer protective layer 7), as taught by Yu, to encase the assemblies of Amphenol and protect those elements from high-humidity and/or high-temperatures.

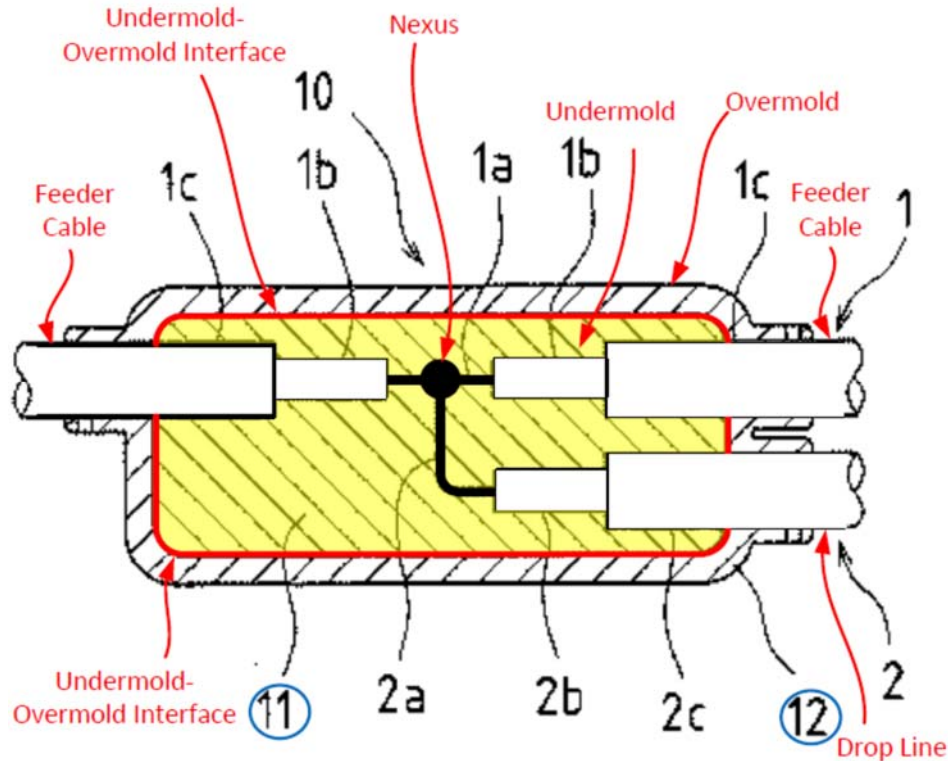
EX1015, ¶5; *Decl.*, ¶¶[263]-[275],[330]. A POSITA would understand that the disclosure of the undermold and overmold in Yu could be applied to the structures with an undermold disclosed by Amphenol and provide additional protection from environmental factors. *Decl.*, ¶[330].

In contrast, Tamura discloses applying an injection molded overmold directly over an undermold of a branch cable connection to provide an added layer of waterproofing. See EX1009, ¶11, 17; *Decl.*, ¶[331]. In particular, Tamura discloses adding an injection-molded outer mold part 12 (i.e., an overmold) directly over an inner mold part 11 (i.e., an undermold) without an intermediate layer therebetween, which together form an undermold-overmold interface only at the outer surface of the undermold. See EX1009, ¶14 and Fig. 1 (1st-annotation); *Decl.*, ¶[331].

A POSITA would appreciate that the approach of Yu could be simplified according to the teaching of Tamura, where the undermold can be fully formed prior to the formation of the overmold because of the use of dissimilar materials and other processing choices that allow the undermold to be fully formed before construction of the overmold. *Decl.*, ¶[332]. A POSITA considering Yu and Tamura would appreciate that the use of dissimilar materials enables the undermold to be fully formed so that an intermediate layer of woven fabric is not necessary, and the overmold can be formed over the undermold using standard

injection molding processes which are well-established, inexpensive, and reliable.

Id.



EX1009, Fig. 1 (1st-annotation)

It would have been obvious to a POSITA to add an injection molded overmold for added protection against environmental elements directly over the undermold, as taught by Tamura. Decl., ¶¶[281]-[299],[333].

Thus, limitation 1(E) is disclosed by the Amphenol-Yu-Yamawaki-Tamura combination.

1(E)(i)

See Ground 1, limitation 1(E)(i).

A POSITA would be similarly motivated to combine the Amphenol-Yu

combination with Yamawaki to provide a simplified system that brings the power from the solar array directly to the inverter without the need for intervening combiner boxes. *Decl.*, ¶¶[276]-[280],[335].

Thus, limitation 1(E)(i) is disclosed by the Amphenol-Yu-Yamawaki-Tamura combination.

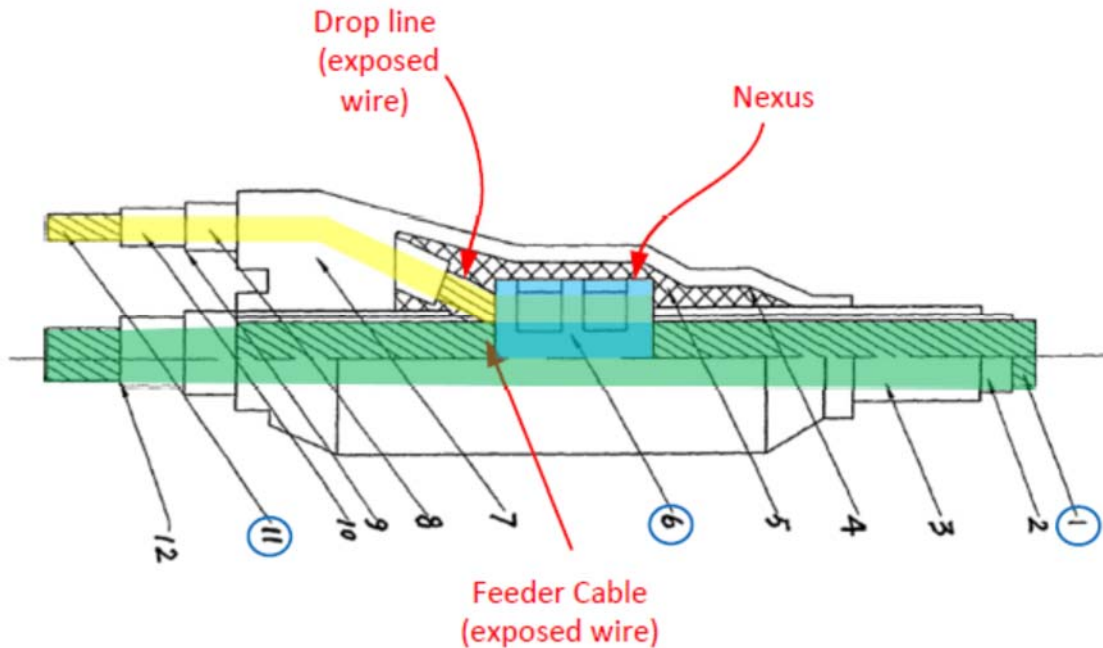
1(E)(ii)

See Ground 1, limitation 1(E)(ii).

Therefore, claim 1 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination. *Decl.*, ¶[338].

2. Claim 2

Yu discloses that the first drop line includes a section of exposed wire at the nexus. EX1015, ¶28 and FIG. 5; *Decl.*, ¶[339].



EX1015, FIG. 1 (1st-annotation)

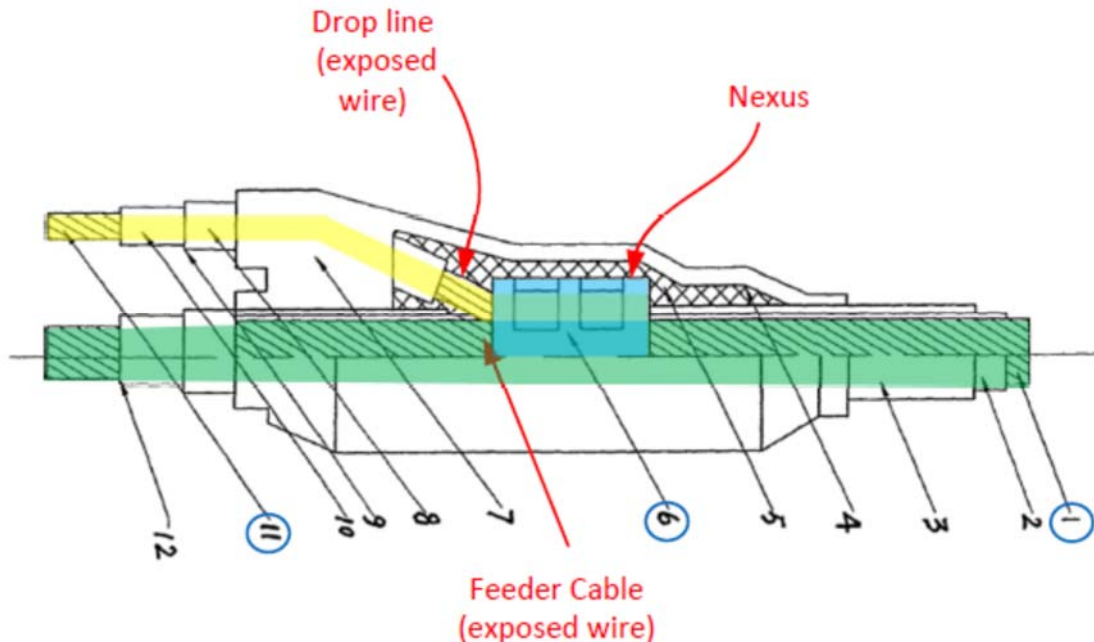
It would have been obvious to a POSITA to expose wires, such as the drop line wire and the feeder cable wire at a nexus, as taught by Yu, to ensure contact is maintained between the two conductive elements when held together by the C-shaped clamp. *Decl.*, ¶¶[263]-[275],[340].

Thus, claim 2 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination.

3. Claim 3

Yu discloses that the feeder cable includes a section of exposed wire at the nexus. EX1015, p.7:18-23 (“the main insulation layer 2, the main outer sheath 3, the branch insulation layer 10 and the branch outer sheath 8 are each peeled off at a joint between the main cable conductor 1 and the branch cable conductor 11, the

main cable conductor 1 and the branch cable conductor 11 are crimped by means of a C-shaped clamp 6”) and FIG. 1. *Decl.*, ¶[342].



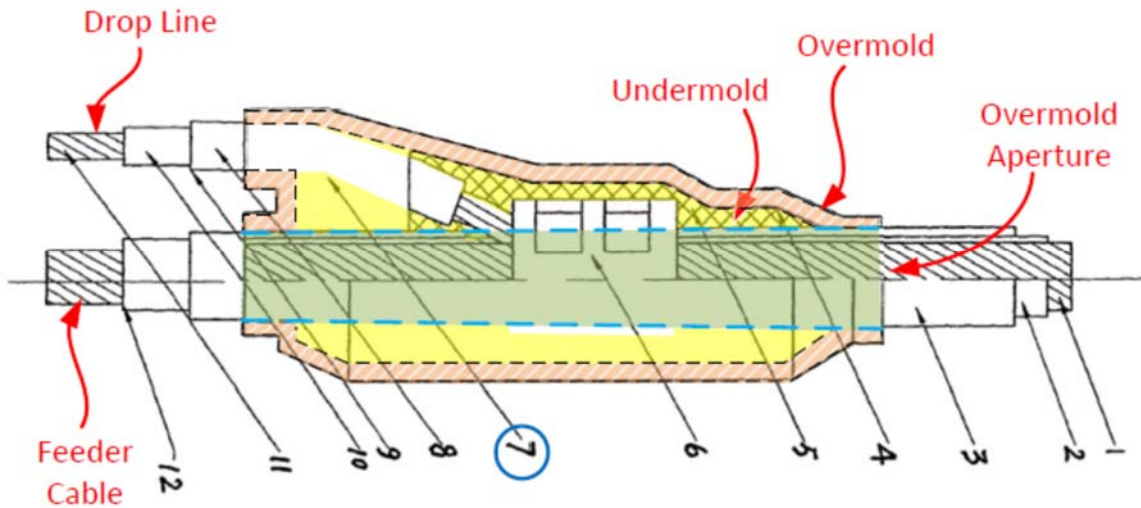
EX1015, FIG. 1 (1st-annotation)

It would have been obvious to a POSITA to expose wires to each other, such as the drop line wire and the feeder cable wire at a nexus, as taught by Yu, to ensure contact is maintained between the two conductive elements. ‘*Decl.*, ¶[343].

Thus, claim 3 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination.

4. Claim 4

Yu discloses that the overmold (i.e., connector outer protective layer 7) defines at least one aperture (i.e. openings for feeder cable). EX1015, FIG. 1; ‘Motivation to Combine Amphenol and Yu;’ *Decl.*, ¶[345].



EX1015, FIG. 1 (2nd-annotation)

It would have been obvious to a POSITA to use an overmold (i.e., connector outer protective layer 7) with an aperture enabling the feeder cable to extend fully through the overmold, as taught by Yu, to encase the underlying assembly and protect the electrical connection between the feeder cable and drop line, as well as the undermold that provides an initial layer of protection, from water and/or fire while providing a pathway for the feeder cable and drop lines from the installation to come together and be connected within the junction. *Decl.*, ¶[346].

Thus, claim 4 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination.

5. Claim 5

Yu discloses that the undermold (i.e., connector insulation layer 5) is injection molded. EX1015, p.7:25-26.

It would have been obvious to a POSITA to use the undermold (i.e.,

connector insulation layer 5) formed by injection molding with suitable flame retardant materials, as taught by Yu, to ensure the assembly is suitable for high temperature and/or high humidity environments. *Decl.*, ¶[349].

Thus, claim 5 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination.

6. Claim 6

Tamura discloses that the overmold (i.e., outside molded portion 12) is injection molded directly over the undermold (i.e., inside molded portion 11). EX10009, ¶22,23.

It would have been obvious to a POSITA to use the overmold (i.e., outside molded portion 12) formed by injection molding with suitable insulating and protecting materials, as taught by Tamura, to ensure the assembly is suitable for protecting a section where a conductor of a branch cable is connected to a conductor of a trunk cable. *Decl.*, ¶¶[281]-[299],[352].

Thus, claim 6 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination.

7. Claim 7

7(Preamble), 7(A)-7(C)(ii)

See Ground 1, limitation 7(Preamble)-limitation 7(C)(ii).

7(C)(iii)-(ix)

See Ground 1, limitation 7(C)(iii-ix) and Ground 3, limitation 1(B)-(E) and

limitation 7(C)(iii-ix).

7(D)-7(D)(ii)

See Ground 1, limitation 1(E)(i) and limitation 7(D).

Therefore, claim 7 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination.

8. Claim 8

See Ground 1, claim 8.

9. Claim 9

See Ground 1, claim 9.

10. Claim 10

See Ground 1, claim 10.

11. Claim 11

See Ground 1, claim 11.

12. Claim 12

See Ground 1, claim 12.

13. Claim 13

See Ground 3, limitation 1(C) and limitation 7(C)(iii-ix).

14. Claim 14

14(Preamble)

See Ground 1, limitation 7(Preamble). A POSITA would have found

limitation 14(A) to be obvious based on Amphenol by disclosing all the elements and thus illustrating that those elements must be constructed to form a solar power installation. *Decl.*, ¶[365].

14(A)

See Ground 1, limitation 7(A). A POSITA would have found limitation 14(A) to be obvious based on Amphenol by disclosing all the elements and thus illustrating that those elements must be connected. *Decl.*, ¶[366].

14(B)

See Ground 1, limitation 7(C)(i). A POSITA would have found limitation 14(B) to be obvious based on Amphenol by disclosing all the elements and thus illustrating that those elements must be connected. *Decl.*, ¶[367].

14(C)

See Ground 1, limitation 7(B). A POSITA would have found limitation 14(C) to be obvious based on Amphenol by disclosing all the elements and thus illustrating that those elements must be connected. *Decl.*, ¶[368].

14(D)

See Ground 1, limitation 7(D). A POSITA would have found limitation 14(D) to be obvious based on Amphenol by disclosing all the elements and thus illustrating that those elements must be connected. *Decl.*, ¶[369].

14(E)

See Ground 1, limitation 1(E)(i) and Ground 3, limitation 1(E)(i). A

POSITA would have found the limitations in limitation 14(E) to be obvious based on the Amphenol-Yu-Yamawaki-Tamura combination by disclosing all the elements and thus illustrating that those elements must be electrically coupled. *Decl.*, ¶[370].

14(E)(i)-(iii)

See Ground 3, claim 1.

Therefore, claim 14 is obvious based on the Amphenol-Yu-Yamawaki-Tamura combination. *Decl.*, ¶[372].

15. Claim 15

See Ground 1, limitation 1(E)(i) and limitation 7(C)(ii), and Ground 3, limitation 1(E)(i).

D. Ground 4: Claims 1-5 and 7-15 are unpatentable under 35 U.S.C. § 103 as obvious in view of Yamawaki and Shao.

Motivation to Combine Yamawaki and Shao

A POSITA would have been motivated to modify Yamawaki with Shao (i.e., the “Yamawaki-Shao combination”). *Decl.*, ¶[375]. As discussed in Ground 1, Yamawaki and Shao both disclose wire harnesses, cable junctions, connectors, and other components that may be used for combining power from elements of a solar array installation, which is the same field as the ’254 Patent. *Decl.*, ¶[376]; *supra*,

pp. 13-14.

A POSITA would have been motivated to combine Yamawaki with Shao because both references address the general problem of providing convenient, flexible, reliable, and low-cost wiring harnesses and Shao provides design and materials that are appropriate choices for these junctions while also providing alternative connector configurations and advantages thereof. *Decl.*, ¶[381]. Shao teaches that “the connection reliability of the branch joint is improved compared with an existing product; the joint has good sealing performance, and is moisture-proof, waterproof, maintenance-free and stable in performance.” EX1008, 5:38-41; *Decl.*, ¶[381]. Also, Shao teaches improvements such that “branch lines no longer need to be bent and turned, so that one branch joint can be omitted, a space occupied for mounting is small, and a line can also be simple and clear.” EX1008, Abstract; *Decl.*, ¶[381].

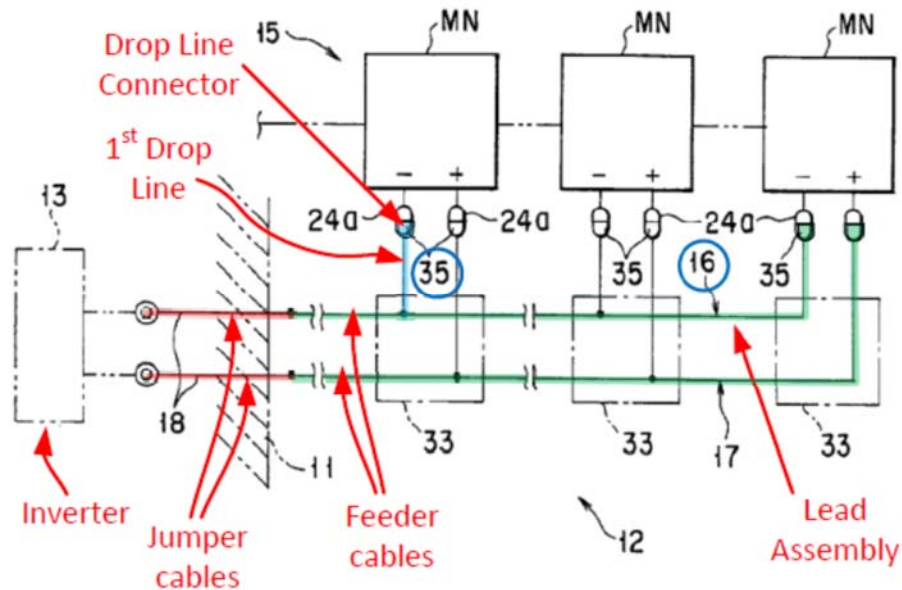
A POSITA would have an expectation of success in combining Yamawaki and Shao because the technologies disclosed by both are complementary and involve well understood methods and designs. *Decl.*, ¶[386].

1. Claim 1

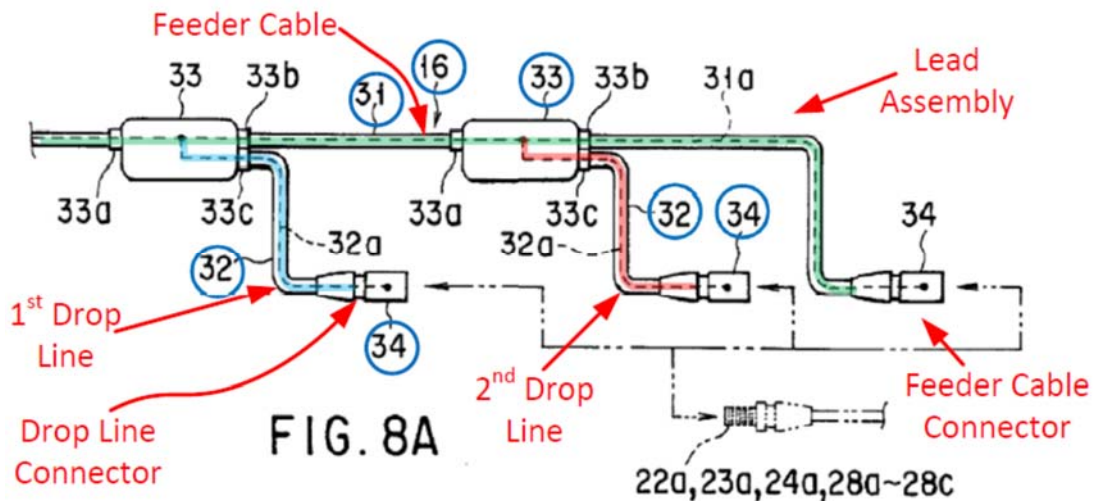
1(Preamble)

Yamawaki discloses a lead assembly (e.g., wiring apparatus 16, green and blue below) for use in a solar energy installation. EX1006, 8:12-15, 9:57-63, FIG.

2, and FIG. 8A; Decl., ¶[389].



EX1006, FIG. 2 (1st-annotation)



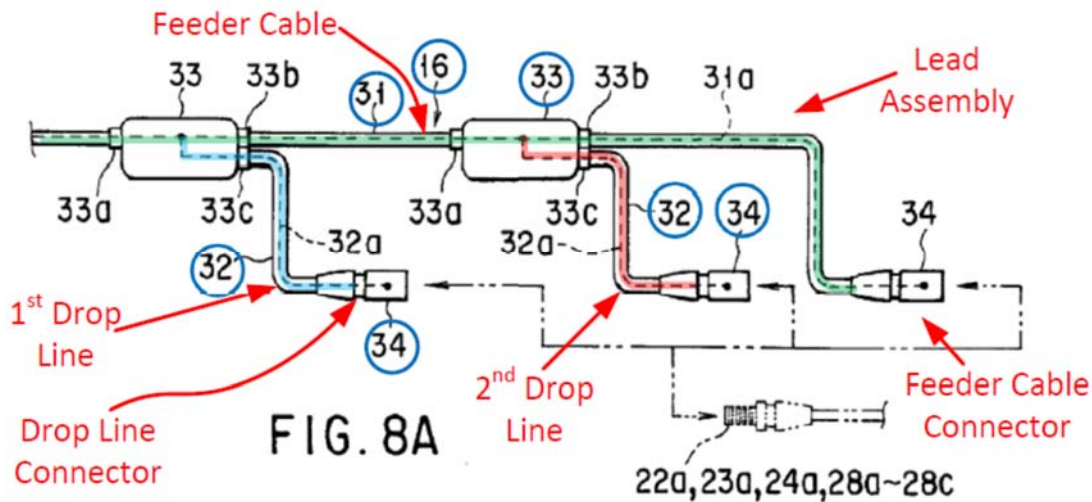
EX1006, FIG. 8A (1st-annotation)

Yamawaki discloses a lead assembly (green) for use in a solar energy installation. Decl., ¶[128],[390].

Thus, limitation 1(Preamble) is disclosed by Yamawaki.

1(A)

Yamawaki discloses a first drop line (e.g., branch cable 32 – highlighted in blue) and a second drop line (e.g., branch cable 32 – highlighted in red). EX1006, 11:3-11 and FIG. 8A; *Decl.*, ¶[392]. The first drop line terminates in a drop line connector (e.g., connector 34). *Id.*

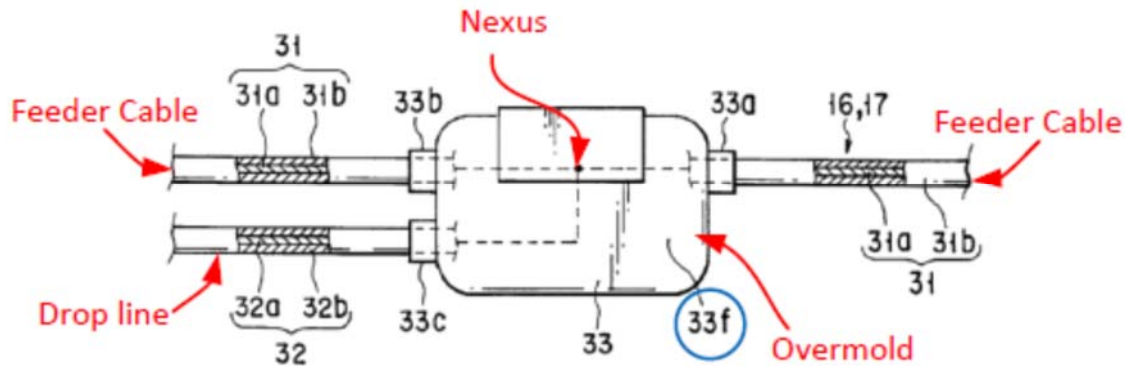


EX1006, FIG. 8A (1st-annotation)

Thus, limitation 1(A) is disclosed by Yamawaki.

1(B)

Yamawaki discloses a feeder cable (i.e., trunk cable 31) terminating in a feeder cable connector (i.e., connector 34). EX1006, FIG. 8A, and FIG. 9A; *Decl.*, ¶[394].



EX1006, FIG. 9A (1st-annotation)

To the extent that Yamawaki does not explicitly disclose that the feeder cable is rated for 30 amps, a POSITA would understand that the selection of feeder cable amperage capacity, of at least 30 amps, is an obvious design choice in view of well-known electric codes and standards. *Decl.*, ¶¶[395]-[396].

Thus, limitation 1(b) is disclosed or rendered obvious by Yamawaki.

1(C)

Shao provides a C-shape clamp that is crimped, providing a means for securing the nexus. EX1008, 5:10-13; *Decl.*, ¶[398]. Shao discloses a feeder cable (i.e., a trunk conductor 1) electrically coupled to a drop line (i.e., a branch-line conductor 2) by an “elongated copper C-shaped clamp is used to form a K-shaped branch connector 5,” which forms a nexus where the feeder cable and the drop line come together. EX1008, 3:15-18 and FIG. 1; *Decl.*, ¶[399]. “The joint is formed by symmetrical overlapping and crimping of one trunk conductor and two branch-line conductors.” *Id.* 5:11-13; *Decl.*, ¶[399]. It would have been obvious to a POSITA to use a clamp, as taught by Shao, to ensure contact is maintained

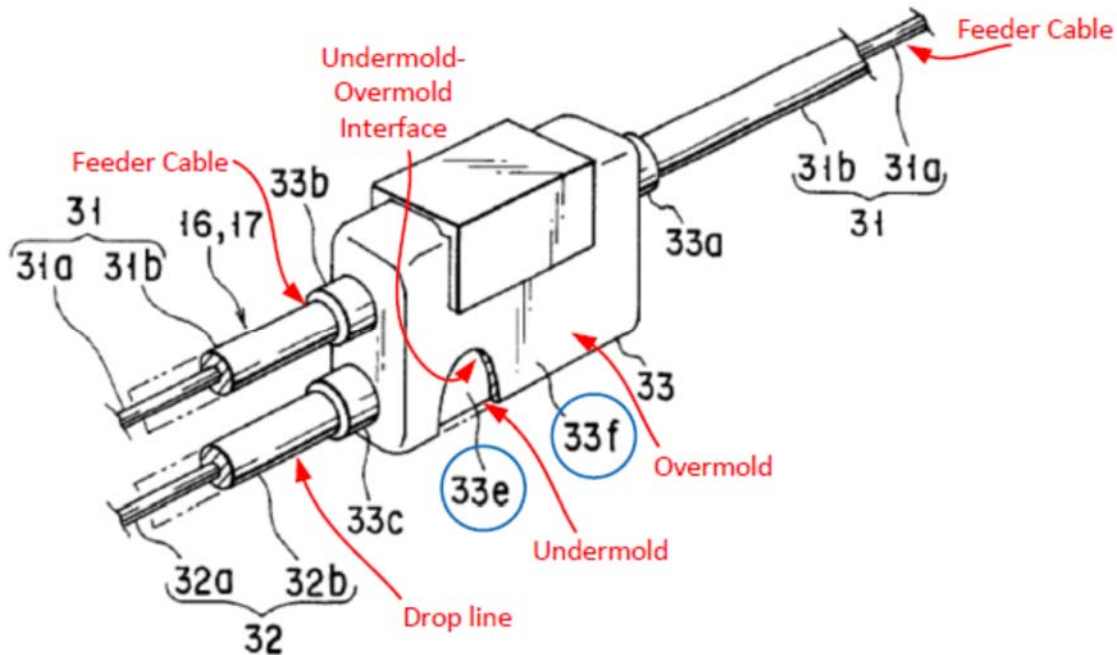
between the three conductive elements. *Decl.*, ¶¶[375]-[388],[399].

Thus, limitation 1(C) is disclosed by the Yamawaki-Shao combination.

1(D)

See Ground 1, limitation 1(D) ((meaning of “undermold”). *See supra*, p. 20.

Yamawaki discloses an undermold (i.e., molded body 33e) that fully encases the nexus, discussed above regarding limitation 1(b). EX1006, 10:19-32 and 13:15-18; *Decl.*, ¶[402]. Yamawaki discloses that “each junction 33 includes a molded body 33e of an electrically insulating synthetic resin material and a cover member 33f that covers the outer surface of the body 33e. ... In each branch junction 33, the trunk conductor 31a and the branch conductor 32a are connected electrically to each other.” *Id.* EX1006, FIGS. 9B; *Decl.*, ¶[402].



EX1006, FIG. 9B (1st-annotation)

Yamawaki discloses an undermold (i.e., molded body 33e) that inherently has inner and outer surfaces, including portions thereof that extend in a longitudinal direction of the feeder cable, with the inner surface surrounding and fully encasing the securing means. *Id.*; *Decl.*, ¶[403]. A POSITA would understand that the structures shown by Yamawaki represent components in which electrical cables enter at the ports on opposite sides of the molded structure and are electrically connected in the interior of the junction. *Decl.*, ¶[403]. A POSITA would understand that the undermold covers over and seals these wires, and that there is an inner surface that must exist at the interface between the mold and the enclosed cables and nexus. *Id.*

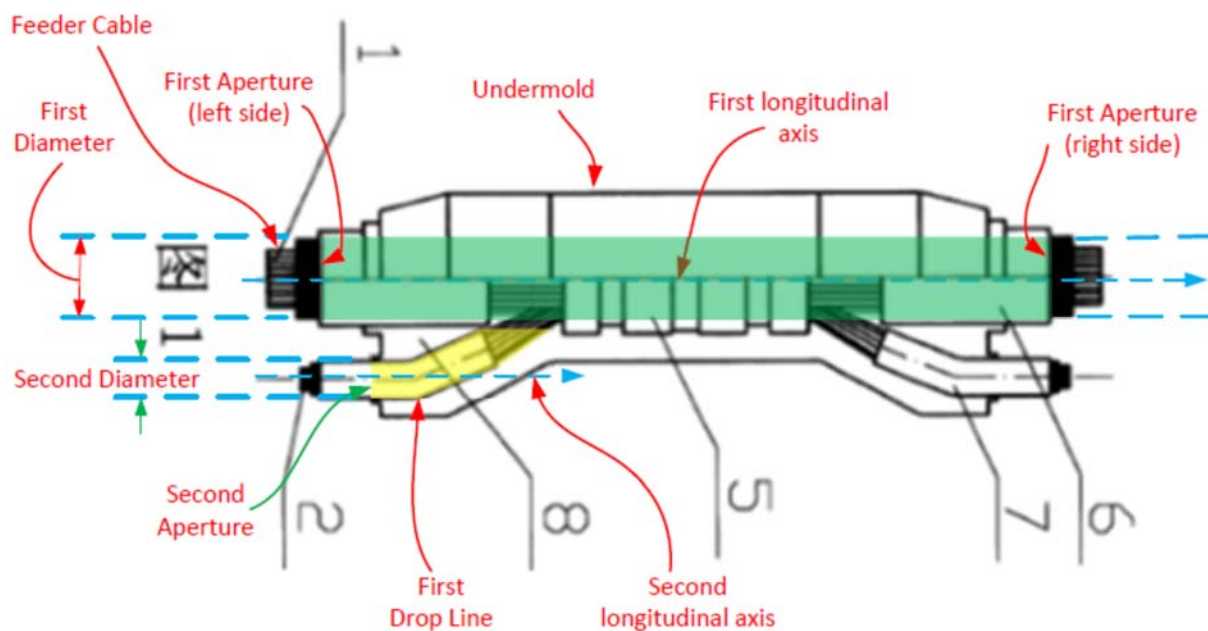
Thus, limitation 1(D) is disclosed by the Yamawaki.

1(D)(i)

See Ground 1, limitation 1(D)(i)(1) (“aperture” not defined by the ’254 Patent). *Supra*, pp. 22-23; *Decl.*, ¶[150].

Shao discloses an undermold (i.e., connector outer sheath 8) that includes an inner surface defined by a first aperture that extends in the longitudinal direction of the feeder cable (i.e., the direction of trunk conductor 1) and that is substantially concentric with the securing means (i.e., C-shaped clamp 5) and the feeder cable.

EX1008, FIG. 1; *Decl.*, ¶[407].



EX1008, FIG. 1 (2nd-annotation)

Also, in Shao the first aperture extends continuously through the undermold (i.e., connector outer sheath 8) in the longitudinal direction and has a first diameter. EX1008, FIG. 1; *Decl.*, ¶[407].

It would have been obvious to a POSITA to use an undermold (i.e., a

connector outer sheath), as taught by Shao, to encase the exposed cables and the clamp holding the feeder and branch cables together and protect those elements from damage and/or exposure. *Decl.*, ¶[408].

Thus, limitation 1 (D)(i) is disclosed by the Yamawaki-Shao combination.

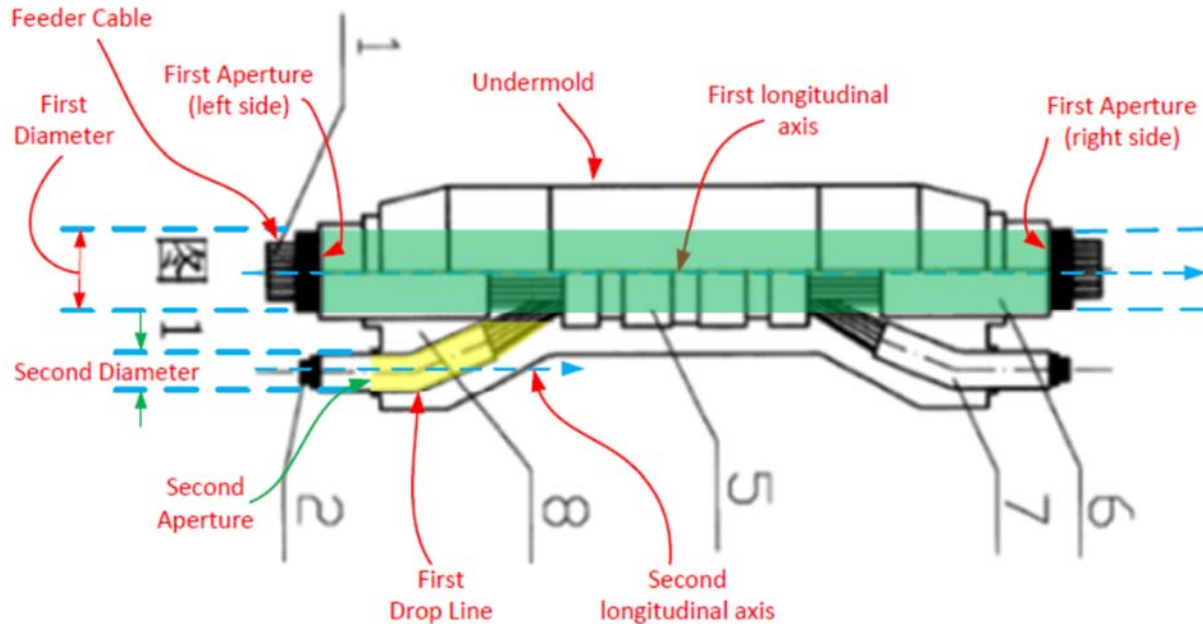
1(D)(ii)

Shao FIG. 1 discloses a feeder cable (i.e., trunk conductor 1) continuously extending through the first aperture. EX1008; *Decl.*, ¶[410]. It would have been obvious to a POSITA to use the configuration of one continuous feeder cable and the associated aperture in the undermold, as taught by Shao, since it is the most natural arrangement of elements and would increase reliability, improved resistance to environmental factors, provide a low profile installation configuration, and would be easy to install. *Decl.*, ¶[410].

Thus, limitation 1(D)(ii) is disclosed by the Yamawaki-Shao combination.

1(D)(iii)

Shao discloses a second aperture concentric with said first drop line (i.e., the branch line conductor 3) and parallel to said first aperture. EX1008, FIG. 1; *Decl.*, ¶[412].



EX1008, FIG. 1 (2nd-annotation)

The second aperture in Shao extends only partially through the undermold in the longitudinal direction, has a diameter that is smaller than the diameter of the first aperture, and the first drop line extends therefrom. EX1008, FIG. 1; *Decl.*, ¶[412]. Shao describes “One trunk conductor and two branch-line conductors are symmetrically overlapped and crimped by means of the K-shaped branch connector 5 to form one joint and two branch- line conductor out-leads.” *Id.* This description indicates that there is a single trunk conductor extending all the way through the junction, and there are also two branch line conductors that are separate cables prior to the assembly. *Id.* When assembled each branch line conductor begins within the nexus and extends outward through the undermold (e.g., outer sheath 8). *Id.* Apertures are formed by the cables extending completely through the undermold, and by the conductors extending partially

through the undermold from the nexus through the undermold. *Id.*

Shao also discloses that the trunk conductor has a first diameter, and the branch line conductors have a diameter that is smaller than the first diameter, and that the aperture associated with the trunk conductor has a first diameter, while that the apertures associated with the branch lines have a smaller diameter. *Decl.*, ¶[413]. As shown the apertures are parallel to each other. *Id.*

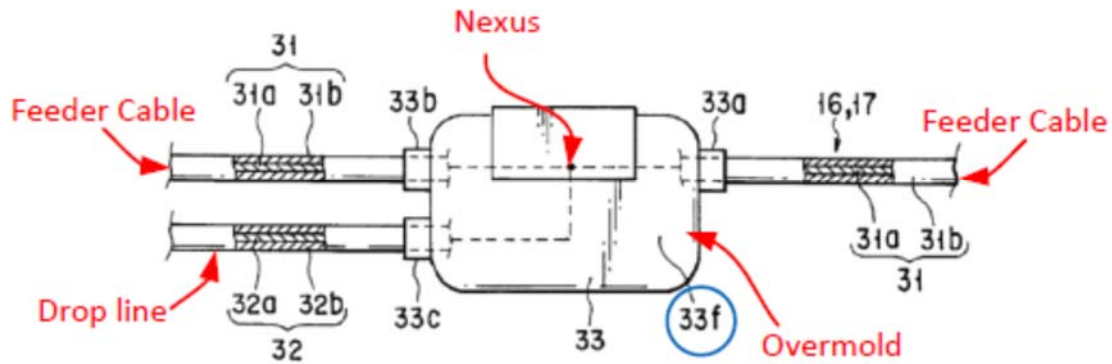
It would have been obvious to a POSITA to use an undermold (i.e., outer sheath 8), as taught by Shao to encase the exposed cables and the clamp holding the feeder and drop lines (i.e., trunk conductor and branch line conductor) together to better protect those elements from damage and/or exposure. *Decl.*, ¶[414].

Thus, limitation 1(D)(iii) is disclosed by the Yamawaki-Shao combination.

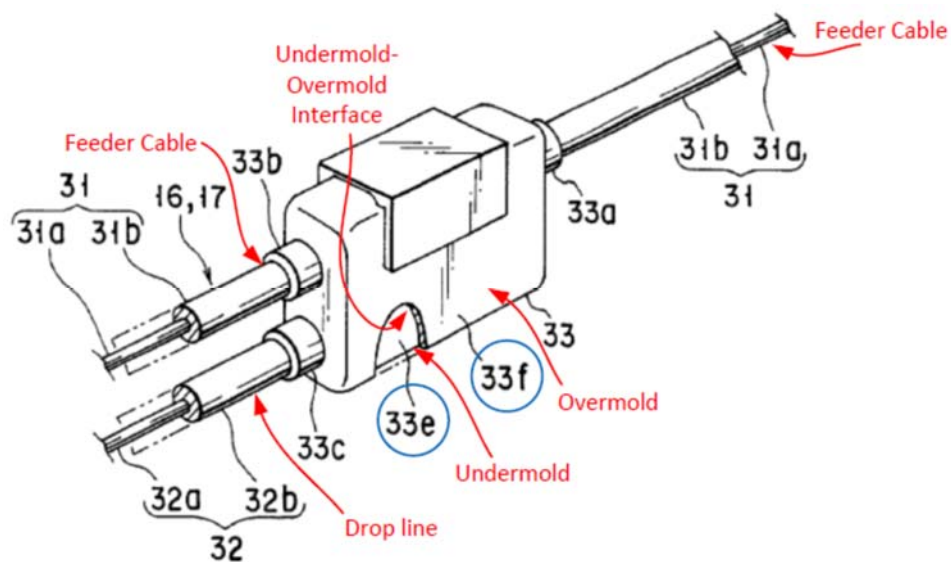
1(E)

See Ground 1, limitation 1(E) regarding meaning of “only.” *See supra*, p. 27; *Decl.*, ¶¶[163][416].

As described in Grounds 1-4, Yamawaki teaches applying an overmold over an undermold of a branch cable connection to provide an added layer of waterproofing. EX1006, FIGS. 9A and 9B, 10:19-22; 13:15-18; *Decl.*, ¶[417].



EX1006, FIG. 9A (1st-annotation)



EX1006, FIG. 9B (1st-annotation)

A POSITA would have found it obvious to apply the overmold taught by Yamawaki to the undermold disclosed by Shao to add protection against environmental elements (e.g., waterproofing) as taught by Yamawaki. *Decl.*, ¶¶[375]-[388],[418].

Thus, limitation 1(E) is disclosed by the Yamawaki-Shao combination.

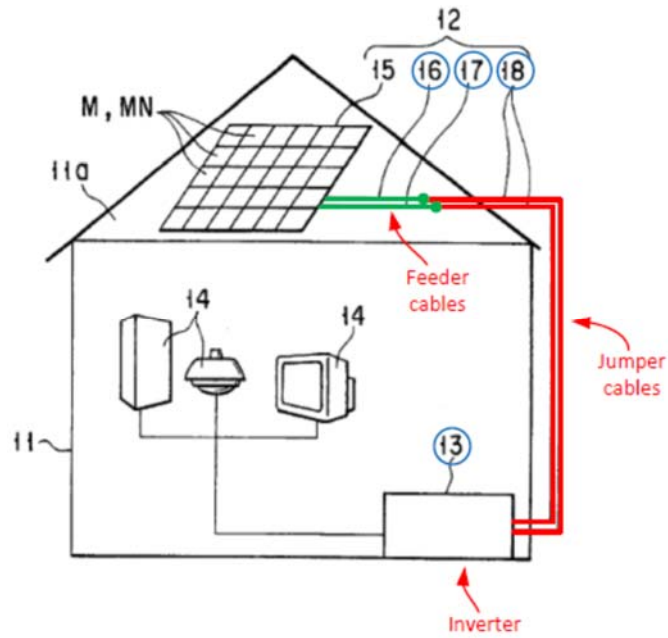
1(E)(i)

See Ground 1, limitation 1(E)(i) regarding the intended use limitation “the

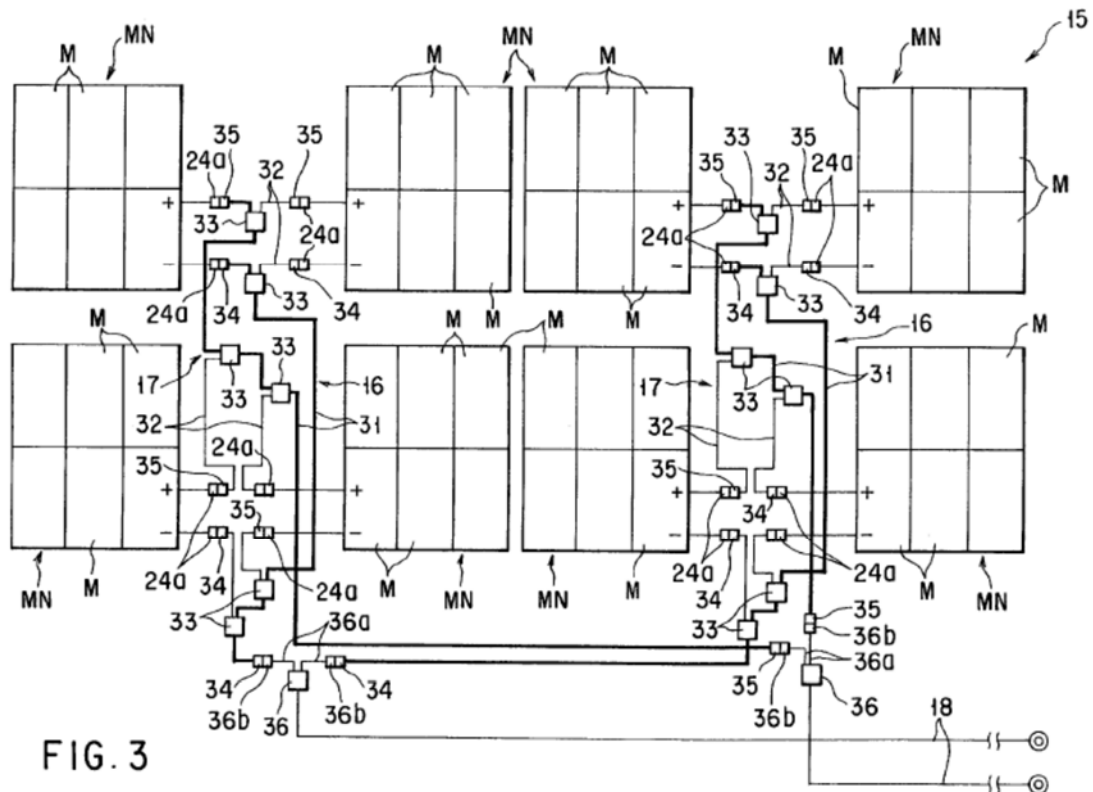
lead assembly combines power from...” should not be given patentable weight).

See supra, pp. 29-30; *Decl.*, ¶¶[168],[420].

Regardless, Yamawaki discloses a lead assembly (i.e., wiring apparatus 16) that combines power from a plurality of solar arrays (photovoltaic modules M, photovoltaic module units MN) and transmits that power to an inverter (inverter unit 13) in a solar energy installation without a combiner box between the solar arrays and the inverter. Yamawaki, 7:46-8:11 and FIG. 1. *Decl.*, ¶¶[421]-[423].



EX1006, FIG. 1 (1st-annotation)



EX1006, FIG. 3

Thus, limitation 1(E)(i) is disclosed by the Yamawaki-Shao combination.

1(E)(ii)

A POSITA would understand that the selection of load capacity of the cables and branch joints forming a feeder cable is an obvious design choice amongst well-known options, such as those in electric codes and standards like the NEC 2002. *Decl.*, ¶[426]. This was recognized by the Examiner during prosecution when the Examiner specifically addressed the limitations related to the 1500 voltage rating recited in the claims, stating:

Applicant has identified the claimed voltage rating to not be found in the prior art. However, as noted above, it would have been obvious as of the effective filing date of the claimed invention for a person having ordinary skill in the art to vary the voltage rating of the lead assembly according to the ultimate electrical requirements of the system. Applicant has not presented or identified evidence in the original specification which show the criticality of the lead assembly having a voltage rating of 1500 VDC.

EX1002, p.151, last paragraph.

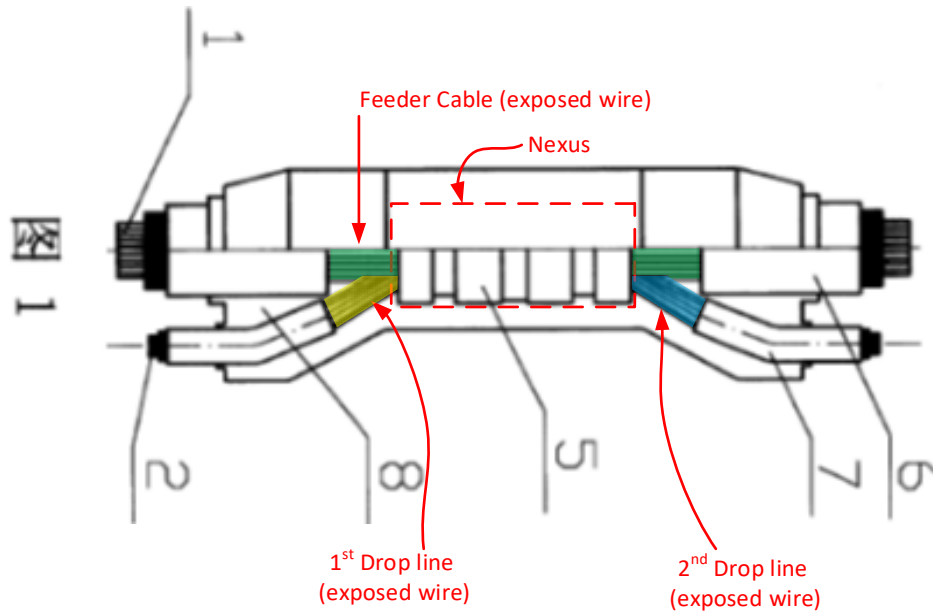
Thus, limitation 1(E)(ii) is disclosed by Yamawaki and Shao. *Decl.*, ¶[427].

Therefore, claim 1 should be found invalid as obvious under 35 U.S.C. § 103 based on Yamawaki and Shao.

2. Claim 2

Shao discloses that the first drop line includes a section of exposed wire (colored yellow in the annotation below) at the nexus. EX1008, ¶28 and FIG. 1;

Decl., ¶[429]. Shao discloses that, “[o]ne trunk conductor and two branch-line conductors are symmetrically overlapped and crimped by means of the K-shaped branch connector 5 to form one joint and two branch-line conductor out-leads, and directions of the branch-line conductor out-leads are opposite.” EX1008, 6:18-22.



EX1008, FIG. 1 (1st-annotation)

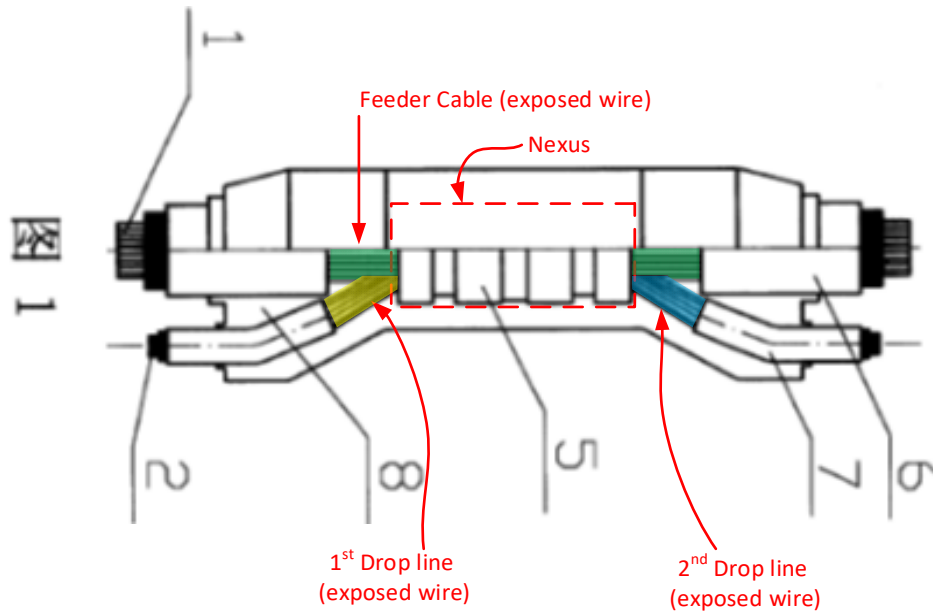
It would have been obvious to a POSITA to expose wires, such as the drop line wires and the feeder cable wire at a nexus, as taught by Shao, to apply a crimped C-shaped clamp that ensures contact is maintained between the two conductive elements. EX1008, 6:18-22. *Decl.*, ¶[430].

Thus, claim 2 is obvious based on the Yamawaki-Shao combination.

3. Claim 3

Shao discloses that the feeder cable includes a section of exposed wire (colored green in the annotation below) at the nexus. EX1008, FIG. 1; *Decl.*,

¶[432]. Shao discloses that the trunk conductor 1 and the branch conductors 2 have insulation stripped away from sections in order to secure the C-shaped clamp that crimps the conductors together and forms the nexus. EX1008, 5:30-34, 6:18-22; *Decl.*, ¶[432].



EX1008, FIG. 1 (1st-annotation)

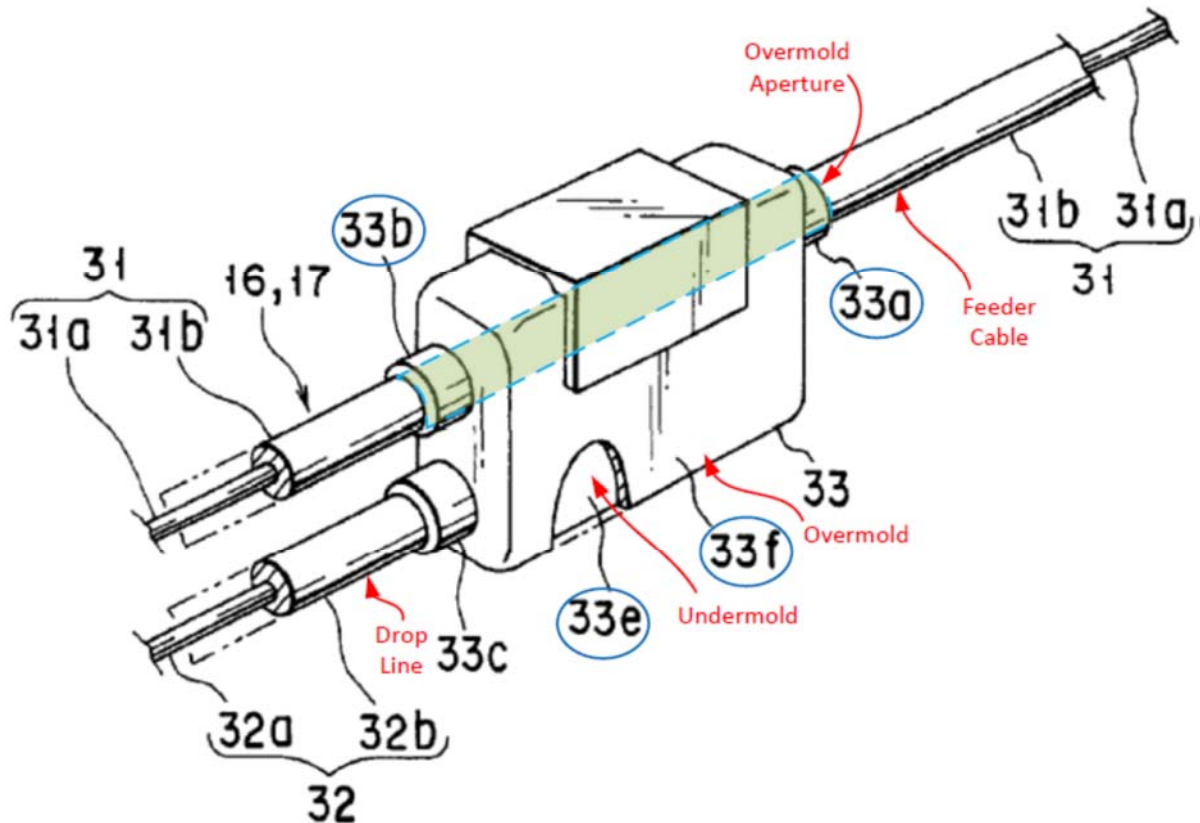
Thus, claim 3 is obvious based on the Yamawaki-Shao combination.

4. Claim 4

See Ground 1, limitation 1(D)(i)(1) (“aperture” not defined by the ’254 Patent). See *supra*, pp. 22-23; *Decl.*, ¶[150].

Yamawaki discloses that the overmold (i.e., the cover member 33f that covers the molded body 33e) defines at least one aperture (green) that extends from a cylindrical trunk cable connecting portion 33a on one side to another cylindrical trunk cable connecting portion 33b on the opposed side. EX1006, col. 10, lines

19-27 and FIG. 9B; *Decl.*, ¶[435].



EX1006, FIG. 9B (2nd-annotation)

Thus, claim 4 is obvious based on the Yamawaki-Shao combination.

5. Claim 5

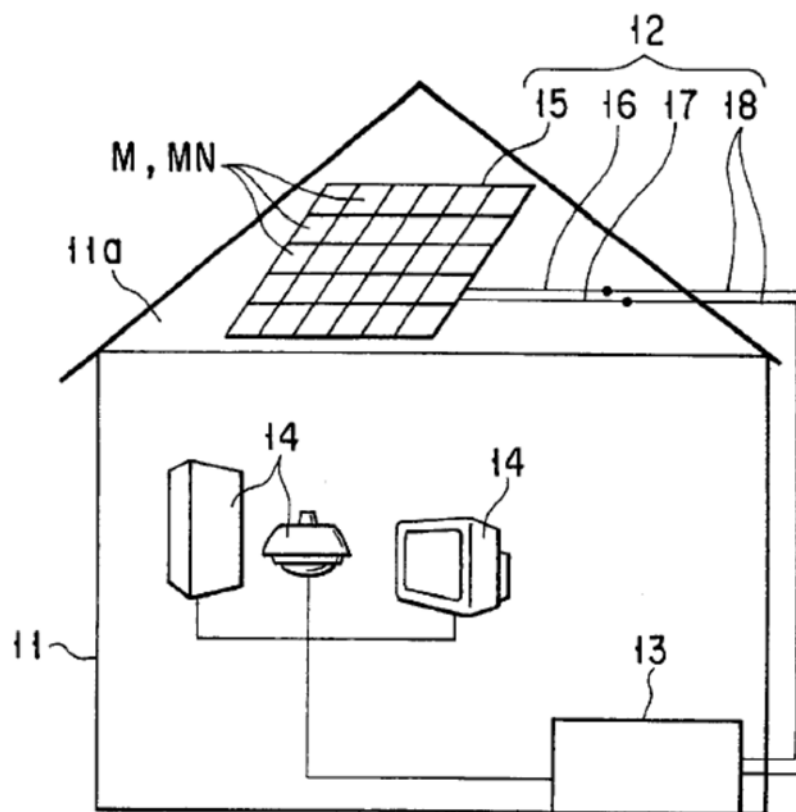
Shao discloses a feeder cable's electrical coupling to drop lines at a nexus that is covered by a sheath made of injection molding material, which is an undermold that fully encases the nexus. EX1008, 5:16-20; *Decl.*, ¶[437]. A POSITA would recognize that an injection molded sheath (i.e., an undermold), as taught by Shao, encases the exposed cables and the metal clamp holding them together provides better protection from damage and/or exposure. 'Motivation to Combine Yamawaki and Shao;' *Decl.*, ¶¶[375]-[388],[483].

Thus, claim 5 is obvious based on the Yamawaki-Shao combination.

6. Claim 7

7(Preamble)

Yamawaki discloses a solar power system (i.e., a photovoltaic generation system). EX1006, 3:9-11 and FIG. 1; *Decl.*, ¶[439].



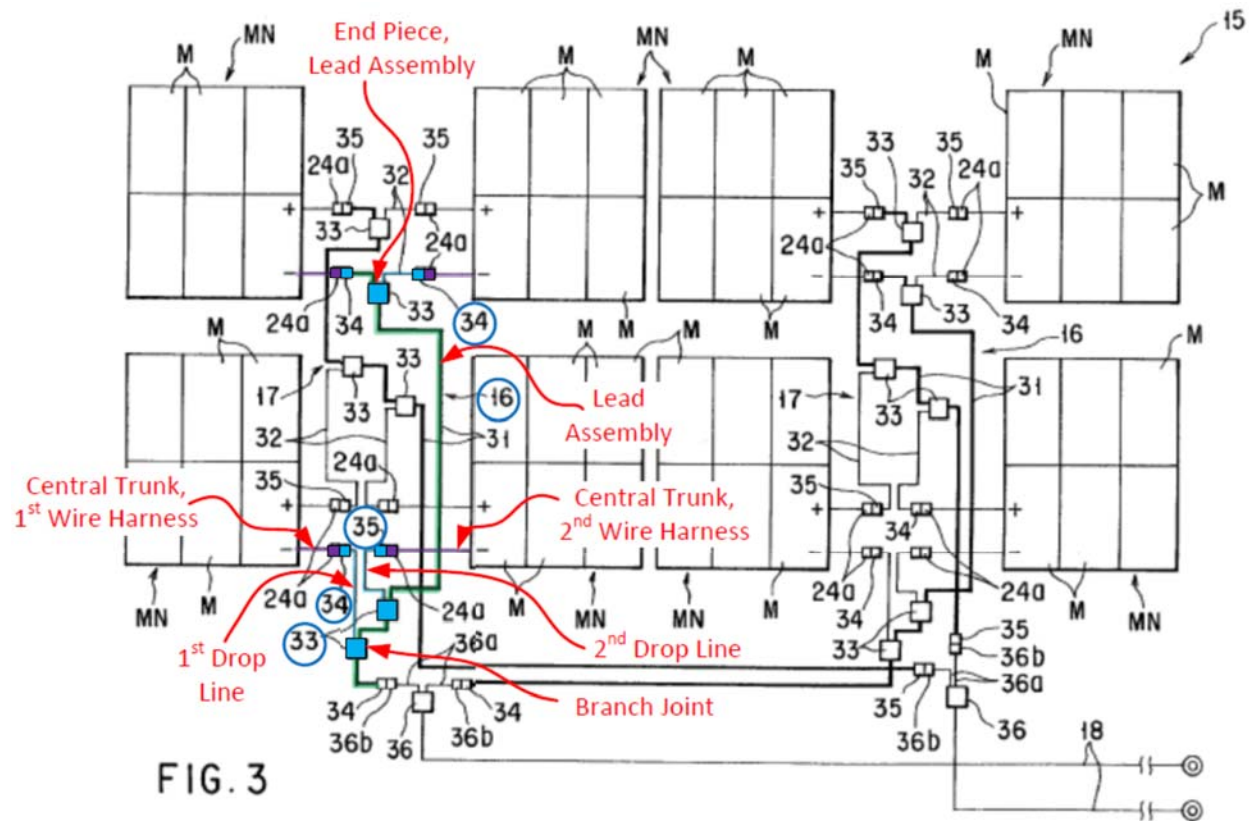
EX1006, FIG. 1

Thus, limitation 7(Preamble) is disclosed by Yamawaki.

7(A)

Yamawaki discloses a first plurality of solar panels (e.g., photovoltaic modules M – the set of six modules M shown in the bottom left corner of the illustration from Yamawaki below) electrically coupled by a first wire harness

(e.g., - in purple below, labeled as “Central Trunk, 1st Wire Harness”) to form a first solar array (i.e., a photovoltaic module units MN). EX1006, 8:12-26, 11:43-55, and FIG. 3; *Decl.*, ¶[441].



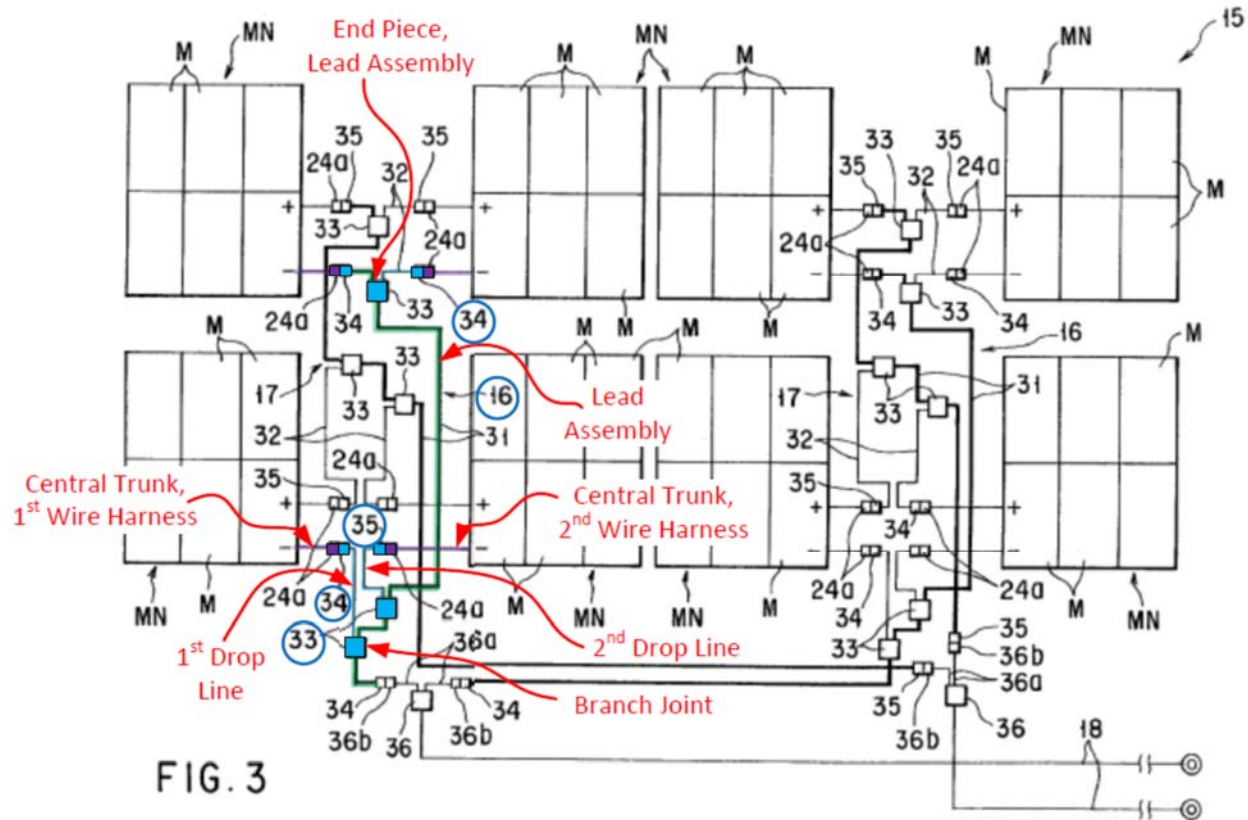
EX1006, FIG. 3 (1st-annotation)

Thus, limitation 7(A) is disclosed by Yamawaki.

7(B)

Yamawaki discloses a second plurality of solar panels (e.g., photovoltaic modules M – the set of six modules M shown in the left, bottom, middle of the illustration from Yamawaki below) electrically coupled by a second wire harness (e.g., - in purple below, labeled as “Central Trunk, 2nd Wire Harness”) to form a

second solar array (i.e., a photovoltaic module units MN). EX1006, 8:12-26, 11:43-55, and FIG. 3; Decl., ¶[443].

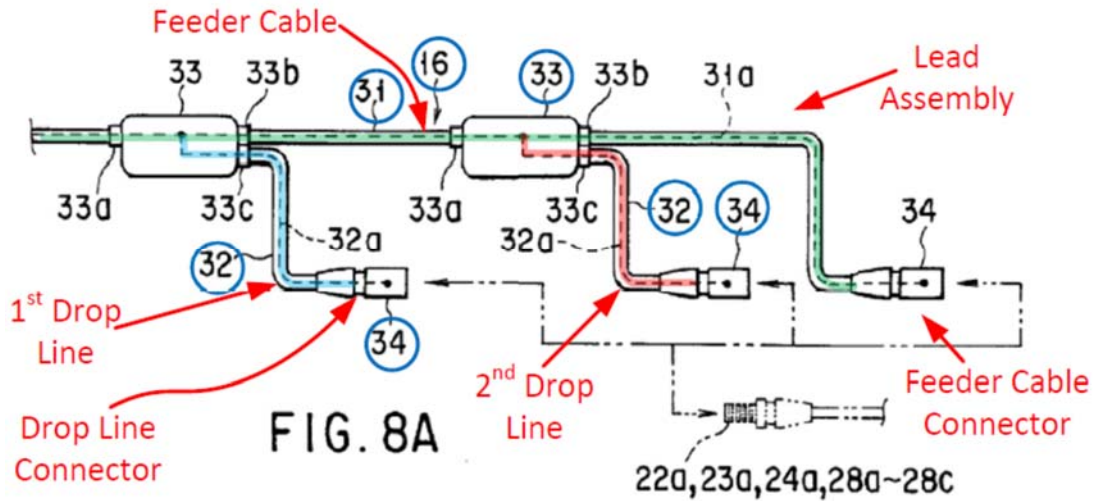


EX1006, FIG. 3 (1st-annotation)

Thus, limitation 7(B) is disclosed by Yamawaki.

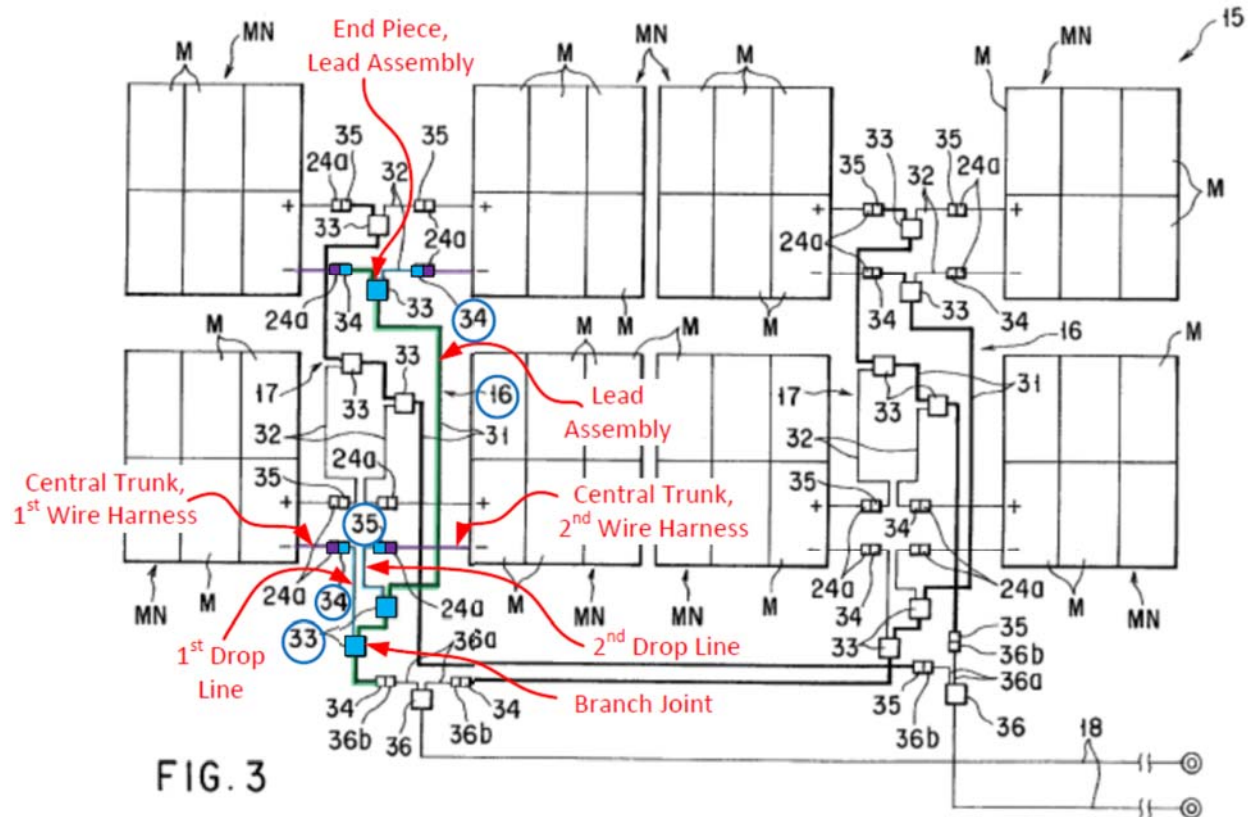
7(C)-7(C)(i)

Yamawaki discloses a first drop line (e.g., branch cable 32 – highlighted in blue) that ends in a drop line connector (e.g., connector 34). EX1006, 11:3-11 and FIG. 8A; Decl., ¶[445].



EX1006, FIG. 8A (1st-annotation)

Additionally, Yamawaki discloses that the first drop line (e.g., branch cable 32 – in blue below, labeled as “1st Drop Line”) is electrically connected to said first wire harness (e.g., - in purple below, labeled as “Central Trunk, 1st Wire Harness”). EX1006, 8:12-26 and FIG. 3; *Decl.*, ¶[446].



EX1006, FIG. 3 (1st-annotation)

Thus, limitation 7(C)(i) is disclosed by Yamawaki.

7(C)(ii)

See Ground 4, limitation 1(B) (feeder cable amperage capacity selection is an obvious design choice). *Decl.*, ¶[448]. Also, see Ground 4, limitation 1(E)(i) (Yamawaki discloses the feeder cable is connected to an inverter). EX1006, 8:1-11, FIG. 1, and FIG. 3; *Decl.*, ¶[448].

Thus, limitation 7(C)(ii) is disclosed by Yamawaki and Shao.

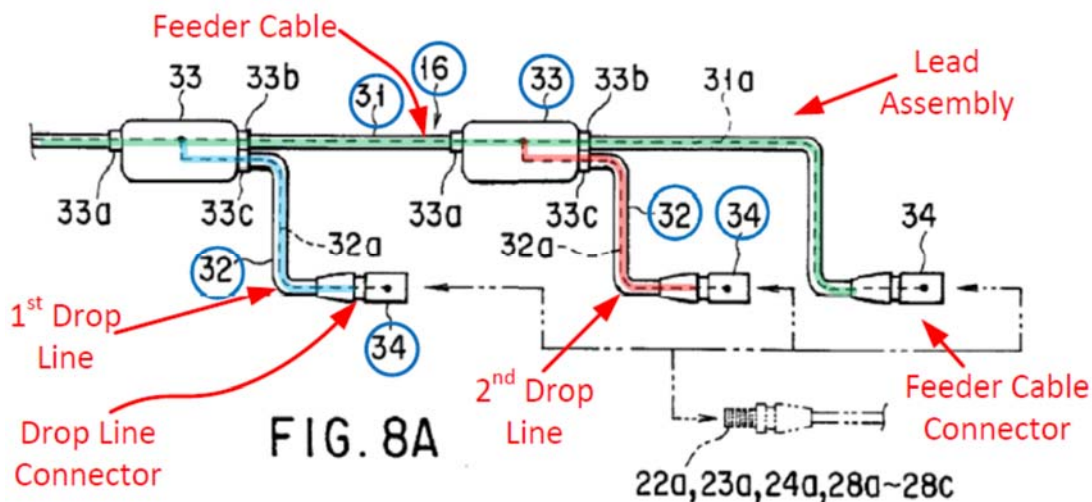
7(C)(iii)-(ix)

See Ground 4, limitation 1(B-E) and regarding “compression lug,” see Ground 1, limitation 7(C)(iii-ix). *Decl.*, ¶[450].

Thus, limitation 7(C)(iii-ix) is disclosed by the Yamawaki-Shao combination.

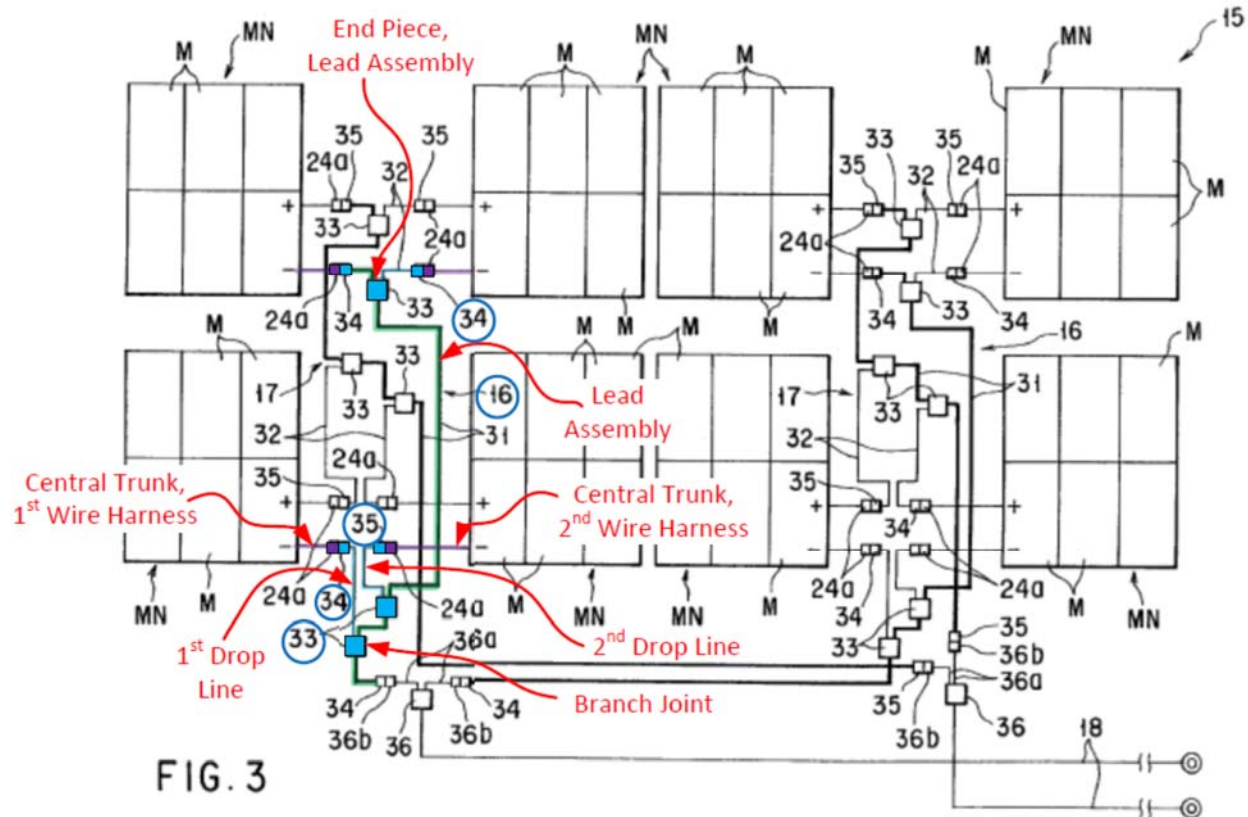
7(D)

Yamawaki discloses a second drop line (e.g., branch cable 32 – highlighted in red) that ends in a drop line connector (e.g., connector 34). EX1006, 11:3-11 and FIG. 8A; *Decl.*, ¶[452].



EX1006, FIG. 8A (1st-annotation)

Additionally, Yamawaki discloses that the second drop line (e.g., branch cable 32 – in blue below, labeled as “2nd Drop Line”) is electrically connected to a second wire harness (e.g., - in purple below, labeled as “Central Trunk, 2nd Wire Harness”). EX1006, 8:12-26 and FIG. 3; *Decl.*, ¶[453].



EX1006, FIG. 3 (1st-annotation)

Thus, limitation 7(D) is disclosed by Yamawaki.

7(D)(i)

Yamawaki discloses the second drop line (e.g., branch cable 32 – highlighted in red) electrically connected to the feeder cable (i.e., trunk cable 31) at a second nexus (e.g., the intersection of the green and red lines). EX1006, 11:3-11 and FIG. 8A; Decl., ¶[455].

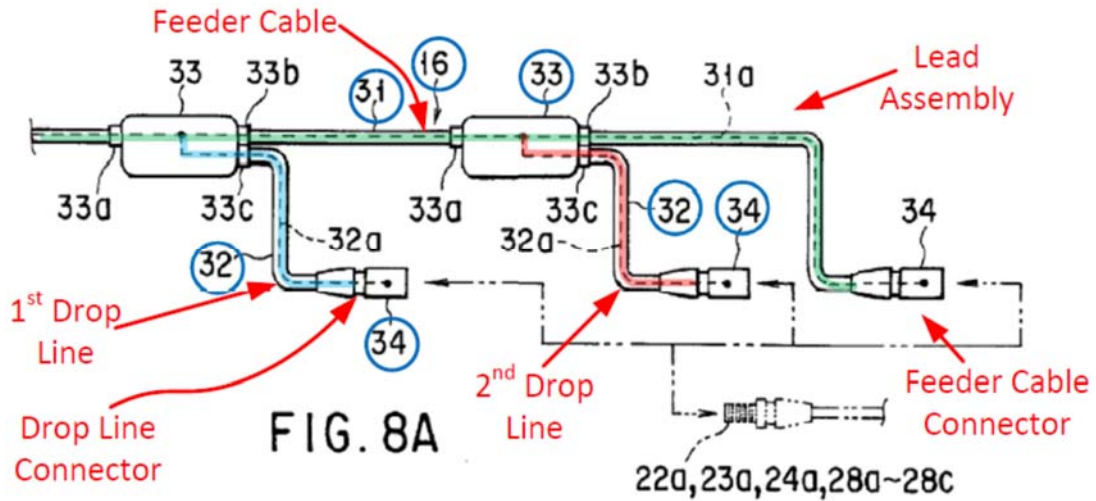


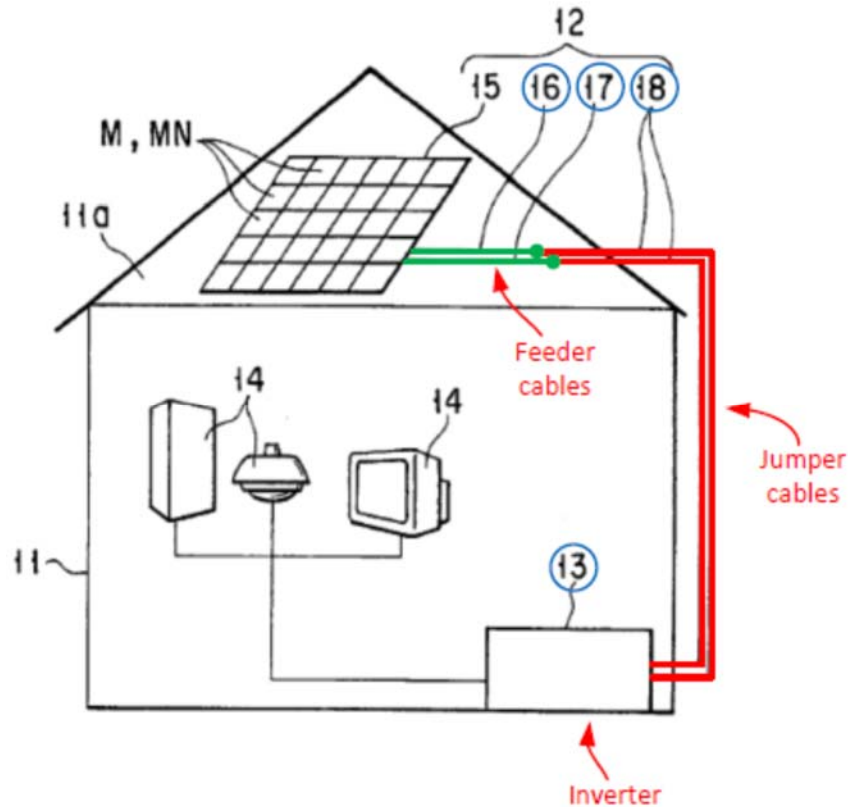
FIG. 8A

EX1006, FIG. 8A (1st-annotation)

Thus, limitation 7(D)(i) is disclosed by Yamawaki.

7(D)(ii)

Yamawaki discloses a solar array with cables connected directly to an inverter without use of a combiner box in FIG. 1. See EX1006, FIG. 1; Decl., ¶[457].



EX1006, FIG. 1 (1st-annotation)

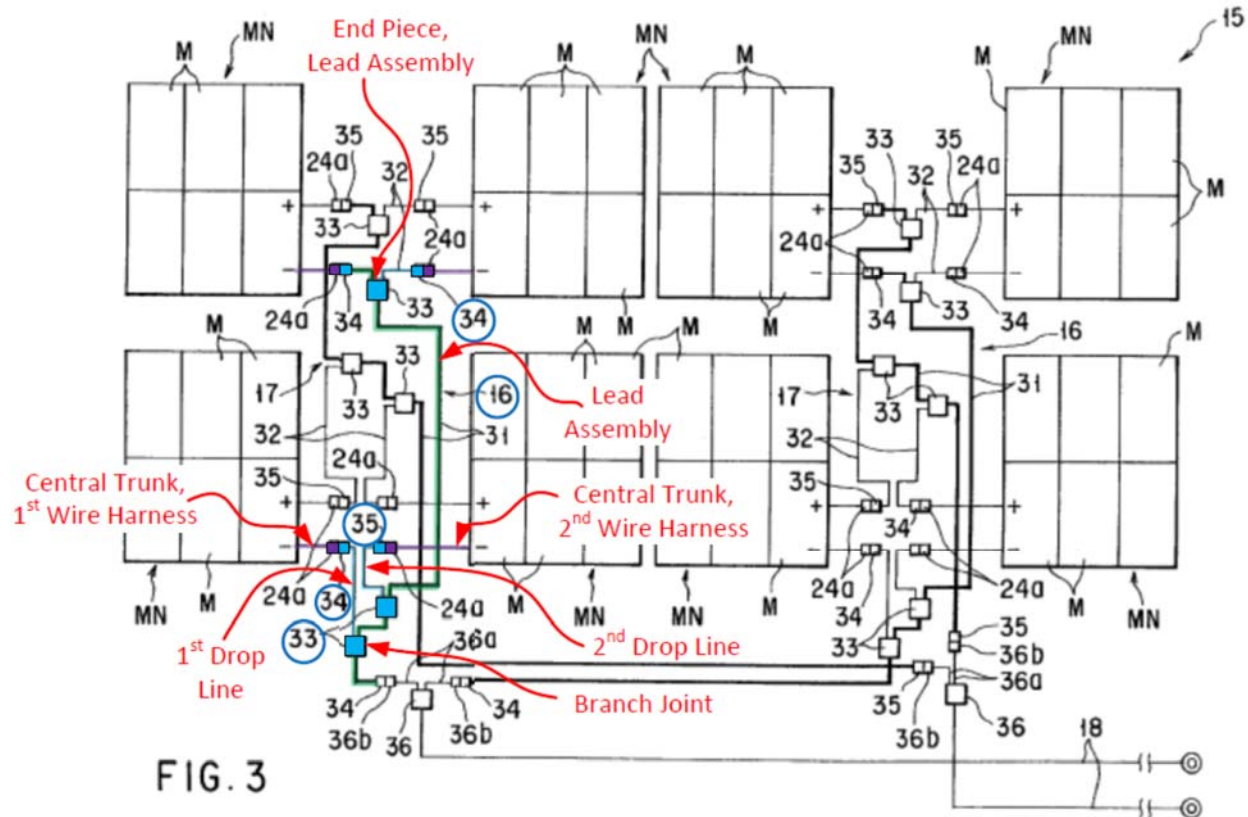
With respect to the expression “upstream of said component,” a POSITA would understand this refers to locations between the component and the solar panels of the installation, which is disclosed by Yamawaki. *Decl.*, ¶[458].

A POSITA would have found the limitation 7(D)(ii) limitation is obvious based on the Yamawaki-Shao combination. *Decl.*, ¶[459].

Therefore, claim 7 is obvious based on the Yamawaki-Shao combination.

7. Claim 8

Yamawaki discloses that the lead assembly (e.g., wiring apparatus 16) includes an end piece (e.g., the ending branch junction 33, labeled as “End Piece, Lead Assembly” below). EX1006, 12:54-67 and FIG. 3; *Decl.*, ¶[461].

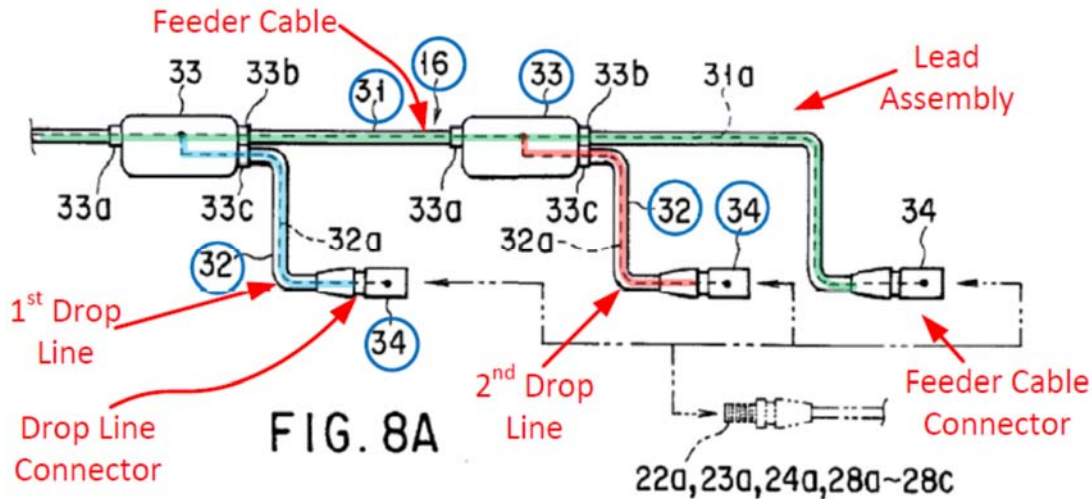


EX1006, FIG. 3 (1st-annotation)

Thus, claim 8 is obvious based on the Yamawaki-Shao combination.

8. Claim 9

Yamawaki discloses a first drop line (e.g., branch cable 32 – highlighted in blue) terminating in a drop line connector (e.g., connector 34). EX1006, 11:3-11 and FIG. 8A; *Decl.*, ¶[463].



EX1006, FIG. 8A (1st-annotation)

Thus, claim 9 is obvious based on the Yamawaki-Shao combination.

9. Claim 10

Yamawaki discloses the feeder cable (i.e., trunk cable 31) terminating in a feeder cable connector (e.g., connector 34). EX1006, 11:3-11 and FIG. 8A; *Decl.*, ¶[465].

Thus, claim 10 is obvious based on the Yamawaki-Shao combination.

10. Claim 11

See Ground 4, limitation 1(B) (selection of wire size/gauge and/or amperage rating is obvious design choice). *Decl.*, ¶¶[395],[467]. A POSITA would understand that the selection of drop line gauge, from 18 to 4, is an obvious design choice in view of well-known electric codes and standards including the NEC 2002. *Decl.*, ¶[467].

Thus, claim 11 is obvious based on the Yamawaki-Shao combination.

11. Claim 12

See Ground 4, limitation 1(B) (selection of wire size/gauge and/or amperage rating is obvious design choice). *Decl.*, ¶¶[395],[470]. A POSITA would understand that the selection of feeder cable gauge, which is related to amperage capacity, of from 6 to 1000 MCM, is an obvious design choice in view of well-known electric codes and standards including the NEC 2002. *Decl.*, ¶¶[470]-[471].

Thus, claim 12 is obvious based on the Yamawaki-Shao combination.

12. Claim 13

See Ground 4, limitations 7(C)(iii-ix).

Thus, claim 13 is obvious based on the Yamawaki-Shao combination.

13. Claim 14

14(Preamble)

See Ground 4, limitation 7(Preamble). A POSITA would have found the limitations in limitation 14(Preamble) to be obvious in view of Yamawaki disclosing limitation 7(Preamble), thus illustrating that those elements must be constructed to form a solar power installation. *Decl.*, ¶[475].

14(A)

See Ground 4, limitation 7(A). A POSITA would have found limitation 14(A) to be obvious based on Yamawaki by disclosing all the elements, thus illustrating that those elements must be connected. *Decl.*, ¶[477].

14(B)

See Ground 4, limitation 7(C)(i). A POSITA would have found limitation 14(B) to be obvious based on Yamawaki by disclosing all the elements, thus illustrating that those elements must be connected. *Decl.*, ¶[479].

14(C)

See Ground 4, limitation 7(B). A POSITA would have found limitation 14(C) to be obvious based on Yamawaki by disclosing all the elements, thus illustrating that those elements must be connected. *Decl.*, ¶[481].

14(D)

See Ground 4, limitation 7(D). A POSITA would have found the limitations in limitation 14(D) to be obvious based on Yamawaki by disclosing all the elements, thus illustrating that those elements must be connected. *Decl.*, ¶[483].

14(E)

See Ground 4, limitation 1(E)(i). A POSITA would have found limitation 14(E) to be obvious based on Yamawaki and Shao by disclosing all the elements, thus disclosing those elements may be electrically coupled. *Decl.*, ¶[485].

14(E)(i)-(iii)

See Ground 4, claim 1.

Therefore, claim 14 is obvious based on the Yamawaki-Shao combination.

14. Claim 15

See Ground 4, limitation 1(E)(i) and limitation 7(C)(ii).

VII. NO BASIS FOR DISCRETIONARY DENIAL

There is no basis to deny institution under 35 U.S.C. § 314(a) because the *Fintiv* factors weigh against discretionary denial. *Apple v. Fintiv*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential). First, if IPR is instituted, Petitioner stipulates to not raise in the parallel District Court proceedings any ground raised or that could have been reasonably raised in the IPR. *Sotera Wireless, Inc., v. Masimo Corp.*, No. IPR2020-01019, Paper 12 at 19 (P.T.A.B. Dec. 1, 2020) (precedential, designated Dec. 17, 2020). Second, a stay has been entered in the parallel District Court proceeding in favor of the ITC proceeding. EX1017; EX1018. The target date for completion of the ITC proceeding is November 12, 2024, and the parallel District Court proceeding will remain stayed until at least after completion of the ITC proceeding. Third, a trial date has not been set and fact discovery has not started. Fourth, the parties here are all also parties in the parallel proceedings. Fifth, the state of parallel proceedings weighs against discretionary denial under this section.

There is no basis to deny institution under 35 U.S.C. § 325(d). Discretionary denial is strongly disfavored here because the “same or substantially the same art or arguments” were not presented to the Office, and the Office “erred in a manner material” to patentability by not asserting the Amphenol, Shao, Yu,

and Tamura references. *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6, 8-9 (Feb. 13, 2020). Analysis of this issue is guided by the “*Becton*” factors. *Advanced Bionics* at 9-11.

The Examiner used Yamawaki as a secondary reference. EX1002, pp.143-226. Grounds 1-3 assert Yamawaki as a secondary reference and Ground 4 asserts Yamawaki as the primary reference. Grounds 1-4 assert Yamawaki for disclosures that the Applicant did not dispute. Grounds 1-4 combine Yamawaki with Amphenol, Shao, Yu, and/or Tamura, which were not cited in any office communication. EX1002, generally.

Regarding *Becton* factors (a) (material differences between asserted art and prior art) and (b) (cumulative nature of the asserted art and prior art), the asserted combinations involving Amphenol, Shao, Yu, Yamawaki, and Tamura are materially different from the combinations of references asserted in Office communications because these references disclose limitations in claim amendments that led to the Notice of Allowance. EX1002, pp.135-137. Thus, they are not merely cumulative of references the Examiner relied on.

Regarding *Becton* factors (c) (evaluation of art during examination), none of Amphenol, Shao, Yu, and Tamura were used in any claim rejections, weighing strongly against exercising discretion. *See Celco Partnership v. Huawei Device Co.*, IPR2020-01117, Paper 10, 13 (Feb. 3, 2021). Further, disclosures of

Yamawaki that the Examiner relied on were not rebutted and therefore are applied in this petition as effectively admitted findings. EX1002, pp.135-137.

Regarding *Becton* factor (d) (extent of overlap), the arguments made in *supra* do not overlap with the arguments made during examination as Applicant did not argue against Yamawaki or assert arguments relevant to disclosures in Amphenol, Shao, Yu, or Tamura. *Id.*

Even if the Board finds that the “same or substantially the same” art or arguments were presented to the Office, discretionary denial under § 325(d) is still not proper because the Office made a “material error” in not finding and applying the Amphenol, Shao, Yu, and/or Tamura references during prosecution per *Becton* factor (e). These references could have been found in the asserted combinations with Yamawaki, to teach all ’254 claim limitations, particularly the features in the Examiner’s “proposed amendment.” *Id.*, pp.103-104.

VIII. CONCLUSION

Inter partes review of claims **1-15** of U.S. Patent No. 10,992,254 is requested based on the Grounds described above.

Respectfully submitted,

The Marbury Law Group, PLLC

A handwritten signature in black ink, reading "Robert M. Hansen", followed by a horizontal line.

Robert M. Hansen, Reg. No. 43,656
Tony A. Gayoso, Reg. No. 37,331
Scott B. Amankwatia, Reg. No. 78,226
Matthew J. Anderson, Reg. No. 78,257

Attorneys for Petitioner

Date: May 8, 2024

The Marbury Law Group, PLLC
11800 Sunrise Valley Drive
15th Floor
Reston, VA 20191
Tel: (703) 391-2900

CERTIFICATION OF SERVICE (37 C.F.R. §§ 42.6(e), 42.105(a))

The undersigned hereby certifies that the above-captioned **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,992,254**, Petitioner's power of attorney, and all associated exhibits were served in their entireties on May 8, 2024, on the following party via FedEx:

Maschoff Brennan
1389 Center Drive, Ste. 300
Suite 300
Park City, UT 84098
UNITED STATES



Robert M. Hansen, Reg. No. 43,656

Attorney for Petitioner

Date: May 8, 2024

The Marbury Law Group, PLLC
11800 Sunrise Valley Drive
15th Floor
Reston, VA 20191
Tel: (703)-391-2900

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION

Pursuant to 37 C.F.R. § 42.24 *et seq.*, the undersigned certifies that this Petition complies with the 14,000-word type-volume limitation. The Petition contains 13,646 words according to the word-processing program used to prepare this document (Microsoft Word), excluding words in figures from the prior art, tables of contents and authorities, the listing of the claims, mandatory notices under 37 C.F.R. §42.8, the certificate of service, this certificate of word count, and the exhibits.

The Marbury Law Group, PLLC

A handwritten signature in black ink, reading "Robert M. Hansen", written over a horizontal line.

Robert M. Hansen, Reg. 43,656
Attorney for Petitioner

Date: May 8, 2024

The Marbury Law Group, PLLC
11800 Sunrise Valley Drive
15th Floor
Reston, VA 20191
Tel: 703-391-2900