

*Petition for Post Grant Review of
U.S. Patent No. 11,689,153*

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**PETITION FOR POST GRANT REVIEW
OF U.S. PATENT NO. 11,689,153**

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EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 11,689,153 to Solon (“’153 Patent”)
1002	Prosecution History of ’153 Patent
1003	Expert Declaration of Thomas W. Kenny (“ <i>Decl.</i> ”)
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 (“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 Patent No. 4080663 to Tamura (“Tamura”) – <i>Translation Certified</i>
1010	“National Electrical Code 2002,” by National Fire Protection Association (“NEC 2002”)
1011	“Photovoltaic System Engineering, Second Edition,” (“PSE textbook”)
1012	Chinese Patent No. CN 2785100 to Shao et al. (“Shao”) – Original
1013	Japanese Patent No. 4080663 to Tamura (“Tamura”) – Original
1014	’153 Patent priority Provisional Patent Application (“’773 Provisional”)
1015	’153 Patent Continuation Application, Filing Receipt

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1016	U.S. Published Patent Application No. 2011/0011642 to Solon (“Solon642”)
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	<i>Shoals Technologies Group, LLC v. Voltage, LLC et al.</i> , 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. 10,992,254 to Solon (“’254 Patent”)
1021	Prosecution History of ’254 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.”)

CLAIMS LISTING

Claim Number/Element	'153 Patent Claim Limitations
1(Preamble)	A lead assembly for use in a solar energy installation including:
1(a)	a drop line terminating at a drop line connector, the drop line connector configured to connect with a central trunk of a wire harness, the central trunk of the wire harness having a plurality of branches that each are configured to electrically connect to a separate solar panel contained in an array of a plurality solar panels;
1(b)	a feeder cable electrically coupled to the drop line at a nexus;
1(c)	an undermold that fully encases the nexus, the undermold further comprising:
1(c)(i)	a first aperture extending completely through the undermold and having a first diameter, wherein the feeder cable extends through the first aperture along a first longitudinal axis; and
1(c)(ii)	a second aperture extending partially through the undermold and having a second diameter different than the first diameter, wherein the drop line extends from the second aperture along a second longitudinal axis;
1(c)(iii)	a third aperture extending partially through the undermold and having a third diameter different than the first diameter, wherein a second drop line extends from the third aperture along a third longitudinal axis; and
1(d)	an overmold surrounding the undermold and forming an undermold-overmold interface at an outer surface of the undermold.

2	The lead assembly of claim 1 wherein the drop line includes a section of exposed wire at the nexus.
3	The lead assembly of claim 2 wherein the feeder cable includes a section of exposed wire at the nexus.
4	The lead assembly of claim 1 wherein the overmold defines at least one attachment aperture.
5	The lead assembly of claim 1, wherein the feeder cable terminates at a feeder cable connector.
6	The lead assembly of claim 5, wherein the feeder cable connector is configured to attach directly to an inverter.
7	The lead assembly of claim 5, wherein the feeder cable connector is configured to attach directly to a jumper cable, which in turn connects directly to an inverter.
8	The lead assembly of claim 1, wherein the first longitudinal axis and the second longitudinal axis are substantially parallel.
9	The lead assembly of claim 1, wherein the second diameter is smaller than the first diameter.
10	The lead assembly of claim 1, wherein the third longitudinal axis is substantially concentric with the second longitudinal axis, and substantially parallel with the first longitudinal axis.
11	The lead assembly of claim 1, wherein the drop line includes a fuse.
12	The lead assembly of claim 1, wherein said lead assembly combines power received from the plurality of solar panels and conducts that power directly to an inverter electrically connected to the feeder cable.
13	The lead assembly of claim 1, wherein the second drop line terminates at a second drop line connector, the second drop line connector configured to connect with a central trunk of a second wire harness, the central trunk of the second wire

	harness having a plurality of branches the each are configured to electrically connect to a separate solar panel contained in a second array of a plurality of solar panels.
14	The lead assembly of claim 13, wherein the lead assembly is configured to combine electrical power received from the array of solar panels and the second array of solar panels at the nexus and to deliver the combined electrical power to an inverter that is in electrical communication with the feeder cable.
15	The lead assembly of claim 1, wherein the second drop line includes a section of exposed wire at the nexus so as to be electrically connected to the feeder cable.
16	The lead assembly of claim 1, wherein the drop line and the second drop line each includes a wire of between four (4) to eighteen (18) gauge.
17	The lead assembly of claim 16, wherein the feeder cable includes a wire of between 250 MCM to 1000 MCM.
18	The lead assembly of claim 15, wherein the electrical coupling between the feeder cable, the drop line and the second drop line at the nexus is secured with at least one of a compression lug, a solder connection, a splice, and a crimp.
19	The lead assembly of claim 1, wherein the undermold is applied by injection molding.
20	The lead assembly of claim 1, wherein the overmold is applied by injection molding.
21(Preamble)	A solar power system comprising:
21(a)	a plurality of solar panels each electrically coupled to one of a plurality of branches of a wire harness to form a first solar array;
21(b)	a lead assembly comprising:

21(b)(i)	a drop line electrically connected to a central trunk of the wire harness and configured to receive power from the plurality of solar panels;
21(b)(ii)	a second drop line electrically connected to a central trunk of a second wire harness and configured to receive power from a plurality of solar panels in a second solar array;
21(b)(iii)	a feeder cable, the feeder cable electrically connected to the drop line and the second drop line at a <i>nexus</i> ; and
21(b)(iv)	a primary mold that fully encases the <i>nexus</i> so as to substantially seal the <i>nexus</i> from external environmental conditions, the primary mold further comprising:
21(b)(iv)(1)	a first aperture extending completely through the primary mold and having a first diameter, wherein the feeder cable extends through the first aperture;
21(b)(iv)(2)	a second aperture extending partially through the primary mold and having a second diameter smaller than the first diameter, wherein the drop line extends into the second aperture and
21(b)(iv)(3)	a third aperture extending partially through the primary mold and having a third diameter smaller than the first diameter, wherein the second drop line extends into the third aperture.
22	The solar power system of claim 21, wherein the feeder cable is directly 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.
23	The solar power system of claim 21, further comprising a secondary mold surrounding the primary mold and forming an undermold-overmold interface at an outer surface of the primary mold.
24(Preamble)	A solar power system comprising:

24(a)	a plurality of solar panels electrically coupled by a wire harness to form a first solar array;
24(b)	a lead assembly comprising:
24(b)(i)	a first drop line electrically connected to the wire harness and configured to receive power from the plurality of solar panels;
24(b)(ii)	a feeder cable, the feeder cable electrically connected to the drop line at a <i>nexus</i> ;
24(b)(iii)	a primary mold that fully encases the <i>nexus</i> so as to substantially seal the <i>nexus</i> from external environmental conditions, the primary mold further comprising:
24(b)(iii)(1)	a first aperture extending completely through the primary mold and having a first diameter, wherein the feeder cable extends through the first aperture along a first longitudinal axis;
24(b)(iii)(2)	a second aperture extending partially through the primary mold and having a second diameter smaller than the first diameter, wherein the drop line extends into the second aperture along a second longitudinal axis; and
24(b)(iv)	a second drop line electrically connected to a second wire harness that connects to a plurality of solar panels, the second drop line electrically connected to the feeder cable at the <i>nexus</i> fully encased by the primary mold, wherein the second drop line extends into a third aperture defined by the primary mold along a third axis.

Voltage, LLC (“Petitioner”) petitions for *post grant* review (PGR) of claims 1-24 of U.S. Patent No. 11,689,153 to Solon, entitled “Photovoltaic in line fuse connector assembly having an integral fuse” (“the ’153 Patent,” EX1001), which according to PTO records, is assigned to Shoals Technologies Group, LLC. EX1001, Cover.

As will be shown, the ’153 Patent claims are directed to well-known and conventional means for electrically coupling wires in various arrangements to combine and distribute electrical current generated from solar panels in a solar installation. All claims are invalid as obvious, improperly claiming the combination of known wiring configurations, electrical connections, and molding techniques disclosed in printed publications before the earliest priority date in a solar installation. The ’153 Patent claims were allowed over a primary reference, which was not disputed, when the applicant amended claims to add a detail from one of the inventor’s earlier patents, which was not disclosed to the Examiner. Besides the inventor’s earlier patent, the added detail was disclosed in prior art the Examiner did not locate.

The claims are also invalid for failure of written description, as each claim requires second and third apertures, each extending partially through an undermold/primary mold from/into which a drop line extends. The only disclosure

of an aperture that extends partially through a mold is Figure 7, which pertains to an embodiment with only a single drop, rather than the embodiments claimed in the '153 patent, which require both first and second drop lines associated with second and third apertures. With no specification description or similar figure, and because the aperture limitations were introduced by an Examiner during prosecution of the parent application with no explanation as to their scope or meaning, one of ordinary skill in the art would not have reasonably concluded that the inventor was in possession of the inventions of Claims 1-24 of the '153 patent as of the earliest priority date.

The claims are also invalid as indefinite, as each claim requires a very specific mold structure with apertures (i.e., 3-D holes) having their own structural limitations not defined anywhere in the specification. The only reference to “aperture” in the limited six-column specification or the sixty-one figures has nothing to do with holes or pathways through a mold structure. Rather, “aperture” refers to a loop on the outer surface of an assembly for securing zip-ties. The intrinsic record provides no guidance on how a POSITA would determine whether an aperture, as required by each claim, extends partially through (or completely through) the mold structure. Yet every claim requires a mold structure having at least two such apertures. While Figure 7 shows a structure that might be considered an aperture extending completely through the mold and a second

aperture extending partially through the mold, when those limitations are applied to a more complex cable assembly and its mold structure, a POSITA cannot, with reasonable certainty, make such a determination. Different tests for determining whether an aperture extends partially through the mold structure yield different results, demonstrating why the claim is indefinite. Nothing in the intrinsic records informs a POSITA which is the correct test.

Accordingly, PGR of the '153 Patent is requested.

I. Mandatory Notices (37 C.F.R. § 42.8(a)(1))

REAL PARTIES 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 being 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”)).
- *Shoals Technologies Group, LLC v. Voltage, LLC et al*, Docket No. 1:23-cv-00365 (M.D.N.C.), which is currently stayed.

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PAYMENT OF FEES

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

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

Petitioner certifies that the '153 Patent is available for *post grant* review and that Petitioner is not barred or estopped from requesting *post grant* review challenging the patent claims on the grounds identified in this Petition.

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

A. Priority Date and Applicable Statutes

The '153 Patent claims priority to U.S. Provisional Application No. 62/047,773 filed 9/9/2014. EX1001, Cover. Without conceding priority to the provisional, the earliest possible priority date for purposes of this PGR petition is

9/9/2014. *Id.* Accordingly, the claims should be evaluated under the post-AIA version of 35 U.S.C. §§ 102, 103.

B. Citation of Prior Art

U.S. Published Patent Application No. 2011/0209741 to Solon

(“Solon741,” EX1005) is prior art under 35 U.S.C. §§ 102(a)(1) because it was published on September 1, 2011, before the earliest priority date of the ’153 Patent. Solon741 was not 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 earliest priority date of the ’153 Patent. EX1006, Cover. Yamawaki was addressed in prosecution by the Examiner as described herein.

“Solar Line – Photovoltaic Interconnections System -- Helios”, Amphenol Industrial Solar Technologies

(“Amphenol,” EX1007) is prior art under 35 U.S.C. § 102(a)(1) because it was published no later than November 30, 2012, before the earliest possible priority date of the ’153 Patent as established in the declaration of Gary Joseph (EX1024). EX1007, Cover. Amphenol was not 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 5/31/2006, before the earliest priority date of the ’153 Patent.

EX1008, Cover. Shao was not considered by the Examiner. EX1008 is a certified translation; the original document is EX1012.

Japanese Patent No. 4080663 to Tamura

(“Tamura,” EX1009) is prior art under 35 U.S.C. § 102(a)(1) because it was published on 4/23/2008, before the earliest priority date of the ’153 Patent.

EX1009, Cover. Tamura was not considered by the Examiner. EX1009 is a certified translation; the original document is EX1013.

C. Statutory Grounds for Challenge

Petitioner requests review of claims 1-24 (“Challenged Claims”) on the following grounds:

GROUND 1: Claims 1, 5-7, 11-14, 16, 17, and 21-24 are unpatentable under AIA 35 U.S.C. § 103(a) as obvious over Solon741 (EX1005) in view of Yamawaki (EX1006).

GROUND 2: Claims 1-3, 5-19, and 21-24 are unpatentable under AIA 35 U.S.C. § 103(a) as obvious over Amphenol (EX1007) in view of Shao (EX1008) in view of Yamawaki (EX1006).

GROUND 3: Claim 20 is unpatentable under AIA 35 U.S.C. § 103(a) as obvious over Amphenol (EX1007) in view of Shao (EX1008) in view of Yamawaki (EX1006), and in view of Tamura (EX1009).

GROUND 4: Claims 1-3, 5, 6, and 8-24 are unpatentable under AIA 35 U.S.C. § 103(a) as obvious over Amphenol (EX1007) in view of Shao (EX1008) in view of Tamura (EX1009).

GROUND 5: Claims 1-3, 5-10, 12-15, 18, 19, and 21-24 are unpatentable under AIA 35 U.S.C. § 103(a) as obvious over Yamawaki (EX1006) in view of Shao (EX1008).

GROUND 6: Claims 11, 16, and 17 are unpatentable under AIA 35 U.S.C. § 103(a) as obvious over Yamawaki (EX1006) in view of Shao (EX1008) in view of Solon741 (EX1005).

GROUND 7: Claim 20 is unpatentable under AIA 35 U.S.C. § 103(a) as obvious over Yamawaki (EX1006) in view of Shao (EX1008) in view of Tamura (EX1009).

GROUND 8: Claims 1-24 are unpatentable under 35 U.S.C. § 112 as being indefinite and for lack of written description.

IV. The '153 Patent

A. Claim of Priority of the '153 Patent

The '153 Patent, entitled “Lead Assembly For Connecting Solar Panel Arrays To Inverter,” issued on 6/27/23, from U.S. Patent Application No. 17/301,609, filed 4/8/21 (EX1015), which is a continuation of U.S. Patent Application No. 14/849,458, filed 9/09/15, that issued as USP 10,992,254 to Solon (“Solon254”), which claims priority to U.S. Provisional Application No. 62/047,773, filed 9/9/14. EX1001, Cover.

B. Specification of the '153 Patent

The '153 Patent describes a lead assembly for use in a solar energy installation, and a solar power system. EX1001, 6:50-9:5.

Claim 1 recites a lead assembly for solar energy installations that includes a drop line, a feeder cable, a nexus where the two are electrically coupled, an undermold with three apertures, and an overmold. *Id.* at 6:50-7:11. Dependent claims 2-20 recite further limitations regarding the drop lines, feeder cable, their longitudinal axes of extension, the nexus, the undermold, and overmold. *Id.* at 7:12-8:4.

Claim 21 recites a solar power system including a plurality of solar panels and a lead assembly, similar in structural limitations as that recited in claim 1. *Id.* at 8:5-33. Claim 21 only recites a primary mold instead of an undermold.

Dependent claims 22-23 recite further limitations regarding a feeder cable, and a secondary mold. *Id.* at 8:34-42.

Claim 24 recites a solar power system with a plurality of solar panels and a lead assembly similar to the lead assembly recited in claim 21 with a primarily mold. *Id.* at 8:43-9:5.

C. Summary of the Prosecution History

The '153 Patent is a continuation of Solon254. Prosecution of the Solon254 patent application is relevant because the terms “first aperture” and “second aperture”, along with related structure limitations to the mold structure recited in the claims, originated in an Examiner email, which explains why these terms do not appear in either patent except in the claims. *Decl.*, ¶¶[0063]-[0070].

Prosecution began with an Office Action on 6/22/22. EX1002, pp.221-239. The Office Action rejected claims under 35 U.S.C. § 102(a)(1) , namely claims 1-3, 8, and 9 as anticipated by U.S. Patent No. 3,852,516 to C Ploog *et al.* (“Ploog”), claims 1, 4, 8, and 9 as anticipated by U.S. Patent No. 6,265,665 to Zahnen (“Zahnen”); and rejected claims under 35 U.S.C. § 103, namely claims 1-3, 5-9, 13-16, 18, and 19 as unpatentable over U.S. Patent No. 6,268,559 to Yamawaki (“Yamawaki”) and Ploog, claim 4 as unpatentable over Yamawaki, Ploog, and U.S. Patent Application No. 2011/0011642 to Solon (“Solon642” EX1016), claim 12 as unpatentable over Ploog and U.S. Patent Application No. 2010/0139733 to

Jonczyk *et al.* (“Jonczyk”), claim 10 as unpatentable over Zahnen and U.S. Patent Application No. 2009/0088032 to Keeven *et al.*, and claims 1-3, 5-8, 10, and 11 as unpatentable over Japanese Patent Publication 2003-293536 to Umeoka and U.S. Patent Application No. 2012/0125395 to Bellacicco *et al.*. Claim 17, which recited a second drop line and a second nexus, was deemed as having allowable subject matter. *Id.*

On 12/22/22, Applicant responded by adding new independent claim 20, amending claim 1 to recite in part “terminating at a drop line connector, the drop line connector configured to connect with a central trunk of a wire harness, the central trunk of the wire harness having a plurality of branches that each electrically connect to a separate solar panel contained in an array of a plurality of solar panels,” and amending independent claim 16 to recite in part “a plurality of solar panels each electrically coupled to one of a plurality of branches of a wire harness...a drop line electrically connected to a central trunk of the wire harness”. *Id.*, pp.106-114.

In a 3/03/23 Final Office Action, claims 1-9 and 15-19 were rejected under 35 U.S.C. § 103, claim 20 was allowed, and claims 10, 11, and 17 were identified as reciting allowable subject matter, but stood rejected as depending on an unpatentable base claim. *Id.*, pp.78-89. Despite the amended language, claims 1-3, 5-9, 15, 16, 18, and 19 were rejected as unpatentable over Yamawaki and Ploog;

claim 4 was rejected as unpatentable over Yamawaki, Ploog, and Solon⁶⁴²; and claim 12 was rejected as unpatentable over Yamawaki, Ploog and Jonczyk. *Id.*, pp.80-88.

The Examiner found that Yamawaki disclosed the claimed drop line, feeder cable, nexus, undermold and overmold. *Id.*, p. 81. The Examiner noted that Yamawaki's undermold / primary mold was not specifically shown to have a first and second aperture. *Id.*, p. 82. The Examiner turned to Ploog, which taught a similar lead assembly having a primary mold also comprising an analogous feeder cable, wherein the mold comprised a first aperture extending completely through the primary mold (material displaced by the cable), such that the feeder cable extends through the first aperture, and a second aperture extending partially through the primary mold (the material displaced by line in the form of an aperture), such that the drop line extends into the second aperture. The Examiner found that that the primary mold of modified Yamawaki would have the first and second apertures with the claimed properties. *Id.*

On 3/10/23, Applicant responded by amending claim 1 to incorporate limitations from claim 10 and amended claim 16 to incorporate limitations from claim 17. *Id.*, pp.65-69. Dependent claims 10 and 17 recited a second drop line and third aperture extending partially through the undermold/primary mold. *Id.*, p.88.

Additionally, Applicant introduced new dependent claims 21-28. *Id.*, pp.65-69. Applicant did not rebut the Examiner's assertions that Yamawaki teaches the first dropline, feeder cable, and overmold/undermold. *Id.*, pp.70,81. Applicant also did not rebut the Examiner's assertions that the claim language of claim 1 did not require a central trunk or a wiring harness and only required a drop line configured to connect to central trunk, or that Yamawaki taught this limitation of central trunk and wiring harness recited in claim 16. *Id.*, pp.70,82-84. Applicant also did not rebut the Examiner's assertions that apertures are inherent in any rigid undermolded structure or that different diameters for connected cables would be obvious to try. *Id.*, p.70,81. Instead, Applicant added limitations related to a third aperture in the undermold for a second drop line and a second harness, which duplicated features already cited in the prior art by the Examiner. *Id.*, pp.65,67,70.

D. Level of Ordinary Skill in the Art

As established by the Expert Declaration of Dr. Thomas W. Kenney dated 3/27/2024 (*See* EX1003, "*Decl.*"), a person having ordinary skill in the art (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.*, ¶[60]. Lack of professional experience can be remedied by additional education, and vice versa. *Id.*

References to a POSITA in this Petition in all cases are a POSITA as of the earliest priority date of the '153 patent.

E. Claim Construction

In this PGR petition, 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).

Petitioner proposes that claim terms be afforded their plain and ordinary meanings. However, some terms are not defined in the specification and the scope of these terms in the art is unclear.

Consistent with plain and ordinary meanings and the context of the claims, Petitioner proposes the following constructions for these terms. Petitioner notes that, due to the structural nature of the claims and prior art, the Grounds below are consistent with these constructions but do not rely on them for a finding of obviousness.

Aperture: The term appears only once in the specification, relating to a hole for receiving zip-ties. EX1001, 4:61-63. This is different than the claimed “apertures” that provide structural limitations to the “undermold” or “primary mold” of the lead assembly. A POSITA would have understood that “aperture” in the '153 Patent 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.” This definition of “aperture” is consistent with the tentative construction in parallel proceedings before the ITC. EX1017, (“Order 16”), pp.38-41. Variations of this definition have previously been proposed by Patent Owner and Petitioner, including:

- an opening into or through something; an opening; an open space between portions of matter;
- a three-dimensional hole or volumetric outline thereof extending from the outer surface of the [undermold / primary mold];
- all or part of a pathway for the [drop line / feeder cable] within the [undermold primary mold];
- pathway into the [undermold / primary mold] along a single axis

EX1017, p.38.

Identifying the bounds of each aperture (i.e., where the aperture begins and ends) within the mold to determine whether the aperture extends completely through (as required by the claims for the first aperture) or partially through (as required by the claims for the second aperture) gives rise to Petitioner’s indefiniteness ground *supra* at Ground 8. The prior art Grounds below are consistent with each of the variations above, unless otherwise stated. However, the prior art Grounds do not rely on the application of any particular variation for a finding of obviousness. Whether using the plain meaning, such as “3-D hole (in

other words, the entire pathway for a cable in the [undermold / primary mold]) that exists when viewed as if the entire cable is removed,” or any of the variations above, the claims are invalid by comparing the mold structures of the prior art with the claims.

Undermold / Primary mold: A POSITA would have understood that “undermold” and “primary mold” in the claims mean a “material molded over a piece or part that seals against environmental factors.” See EX1001, FIGS.48,54,55,60 and generally; *Decl.* ¶[118]. This definition is consistent with a definition adopted by Order 16 in the ITC involving the ’153 Patent and U.S. Patent No. 10,553,739 (the “’739 patent”). EX1017, 17:8-11,20:14-15,37:16-19. Although the definition of “undermold” (as opposed to “primary mold”) in Order 16 related to the ’739 patent, the conclusion is informative. *Id.*

Although the ’153 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. *Decl.* ¶[89]-[93],[187]. “Wire harnesses” and “lead assemblies” both refer to wiring or cable assemblies used for organizing electrical connections within electrical power systems. *See id.* Similarly, “trunk” or “main cable,” may refer to “feeder cable,” “branch”, “drop”, “input” or “string” if referring to the function of transmitting electric current between the solar panel and

the electrical connection point in the cable assembly, or may refer to “drop line”.

In some cases, “branch cable” or “branch wire” may also refer to the “drop line” if referring to the actual “drop line” cable or wire. *Decl.* ¶¶[188]-[189].

V. Grounds of Rejection

The following discussion and the accompanying evidence demonstrate that there is a reasonable likelihood that Petitioner will prevail with respect to at least one of 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 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). Petitioner is unaware of any secondary considerations relevant to the ’153 Patent. Further, a more than adequate written rationale is provided in each ground to support the combination of the asserted prior art under *KSR*. 550 U.S. at 418.

A. Ground 1: Claims 1, 5-7, 11-14, 16, 17, and 21-24 are unpatentable under 35 U.S.C. § 103 as obvious in view of Solon741 and Yamawaki.

- **Motivation to Combine Solon741 and Yamawaki**

A POSITA would have been motivated to combine the teachings of Solon741 with those of Yamawaki (the “Solon741-Yamawaki combination”) for the reasons presented below and identified for individual claim elements.

Both Solon741 and Yamawaki are analogous prior art to the '153 patent since they disclose components and methods for assembling solar power systems. *Decl.* ¶¶[87]-[99]. Solon741 “relates generally to components used in the solar energy industry” and focuses on wire harnesses for solar applications. EX1005, ¶[0002]. Yamawaki discloses photovoltaic systems with wiring structures arranged in various ways to overcome challenges and support the design of photovoltaic panel arrays, such as a home solar energy installation. EX1006, 7:54-8:11. Further, both Solon741 and Yamawaki are analogous prior-art to the '153 patent because they are directed to solar power wiring assemblies like those claimed in the '153 patent. *Decl.* ¶[99]. Therefore, a POSITA designing or fabricating a solar power system and solving the problems addressed in the '153 patent would be aware of and motivated to consider both Solon741 and Yamawaki. *Decl.* ¶¶[96]-[98].

A POSITA would have been motivated to modify the wiring harnesses and solar array configurations of Solon741 with the teachings of Yamawaki for multiple reasons. First, Yamawaki discloses information regarding installation of solar array systems that is not disclosed in Solon741, providing a POSITA with additional guidance for designing and fabricating a variety of such systems. *Decl.* ¶[96]. Second, Yamawaki teaches methods for providing electrical junctions with additional protection against moisture intrusion and damage by applying an

overmold. *Id.*, ¶[97]; *see also* discussion of claim element 1(d) below. Third, Yamawaki discloses components and configurations that can simplify the design and construction of a solar array system with a hierarchical wiring design that collects power in steps from multiple solar panels. *Decl.* ¶[96]; EX1006, 2:45-65.

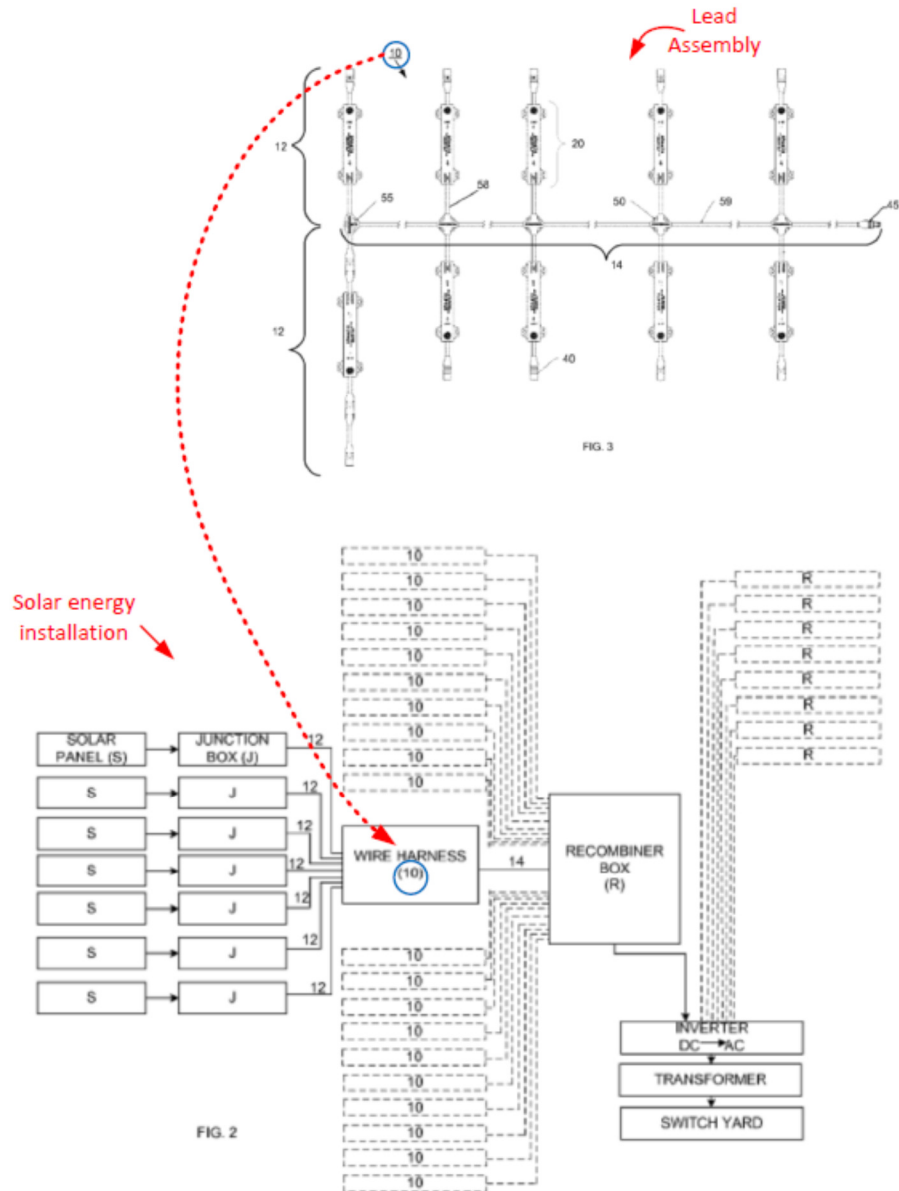
Solon741 and Yamawaki are not cumulative references because Solon741 focuses on wiring harnesses and assembling of components to such harnesses, while Yamawaki addresses lower-level and higher-level building blocks of solar power installations, each of which a POSITA would have known and used when designing a solar installation. *Id.*, ¶[87],[95],[96].

Finally, a POSITA would have an expectation of success in combining teachings of Solon741 and Yamawaki because both references are directed to grid-connected solar power installations governed by the same standards in a predictable technology and the systems of Solon741 and Yamawaki would be serviced by the same skilled artisans such as a POSITA. *Id.*, ¶[101].

1. Claim 1

Preamble

To the extent the preamble is limiting, Solon741 discloses a lead assembly for a solar energy installation, as shown in annotated FIGS. 2 and 3 below. *See* EX1005; *Decl.* ¶[87]-[89].



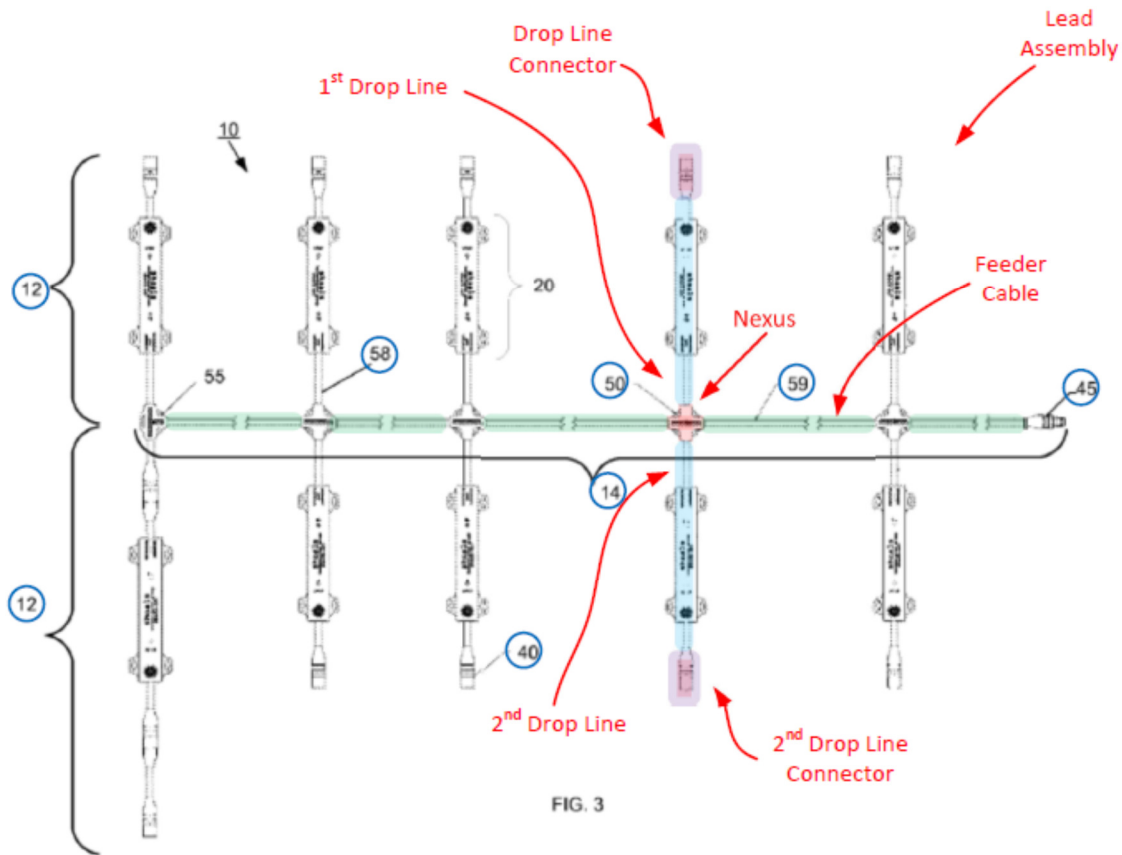
EX1005, FIGS. 2 and 3 (combined with 1st-annotation)

Thus, claim element 1(Preamble) is disclosed by Solon741. *Decl.* ¶[107].

1(a)

Solon741 discloses multiple drop lines (**branches 12**) branching off a feeder cable (**trunk 14**). Drop lines (**branches 12**) include a branch wire (58) extending

from a nexus (cross joint 50) to a drop line connector (connector 40). EX1005,
FIG.3.

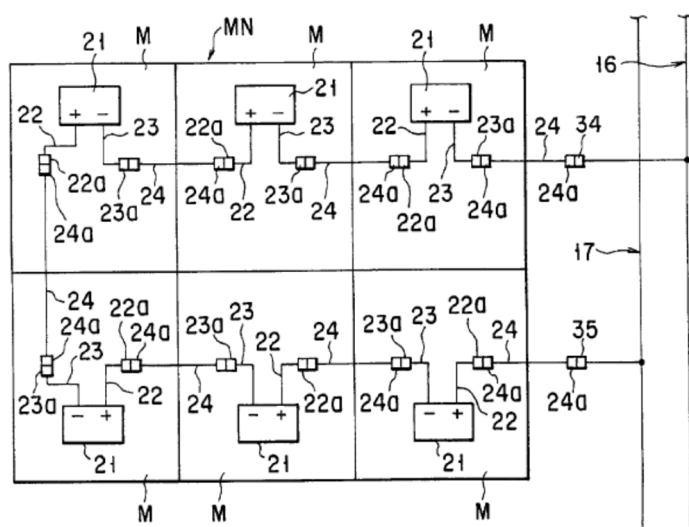


EX1005, FIG. 3 (1st-annotation)

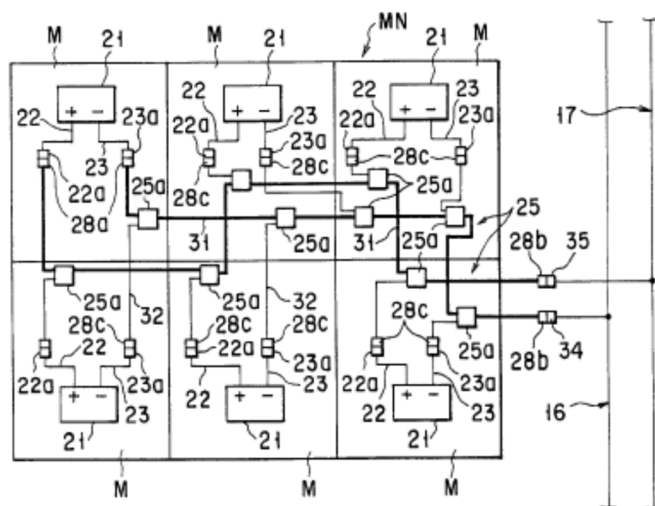
Solon741 FIG. 2 shows drop lines (branches 12) from the lead assembly (wire harness 10) connected to a plurality of solar panels (S). *See id.*, FIG. 2.

Although Solon741 does not explicitly state that the drop line connectors from each drop line are connected to a central trunk of another wiring assembly (i.e., a wire harness), Yamawaki teaches coupling wire harnesses to other wire harnesses and cable assemblies to pass current from multiple panels to a common connection (i.e., central trunk), such as the inverter or junction box. EX1006, 8:17-

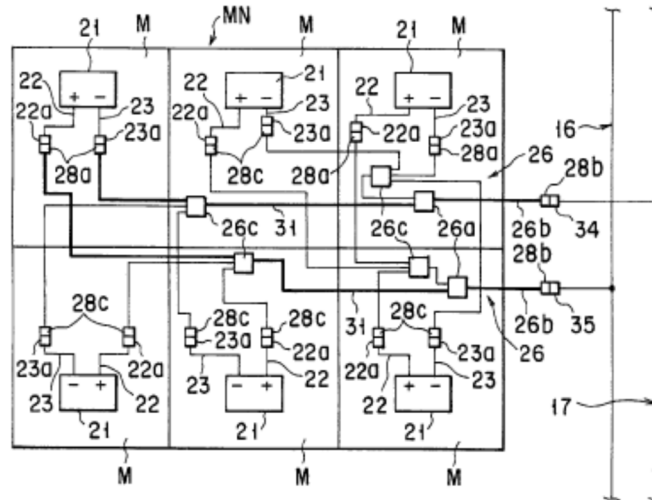
26, FIGS.4-6.



EX1006, FIG. 4



EX1006, FIG. 5



EX1006, FIG. 6

A POSITA would have been motivated to connect wire harnesses of Solon741, electrically connected to solar panel, to intermediate wire harnesses (i.e., a lead assembly) as taught by Yamawaki as a practical way to combine currents from multiple panels. *Decl.* ¶[111]. Further, a POSITA would know how to select wire harnesses and intermediate wire harnesses to complete such assemblies. *Id.*, [112]-[113] (citing EX1010 and EX1011).

Thus, element 1(a) is obvious based on the Solon741-Yamawaki combination. *Decl.* ¶[114].

1(b)

Solon741 discloses a feeder cable (trunk 14) connected to drop lines (branches 12) at a nexus (cross joint 50). EX1005, ¶[0029], FIG.3.

Thus, Solon741 discloses element 1(b). *Decl.* ¶[117].

The '153 Patent does not define “undermold.” Per the claim construction section, a POSITA would understand “undermold” to mean a “material molded over a piece or part that seals against environmental factors.” *See* IV.E. Claim Construction *supra*; *Decl.* ¶¶[118].

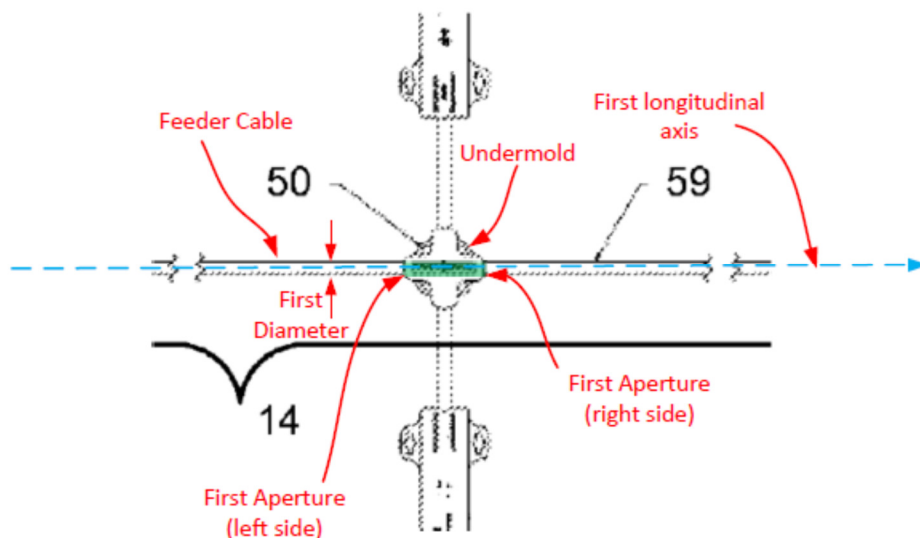
24

Decl. ¶[119].

Thus, element 1(c) is obvious based on Solon741. *Decl.* ¶[122].

1(c)(i)

Solon741 FIG. 3 discloses a first aperture (annotated in green) extending completely through the undermold and having a first diameter, wherein the feeder cable extends through the first aperture along a first longitudinal axis. EX1005; *Decl.* ¶[123].



EX1005, FIG. 3 (Relief and 2nd-annotation)

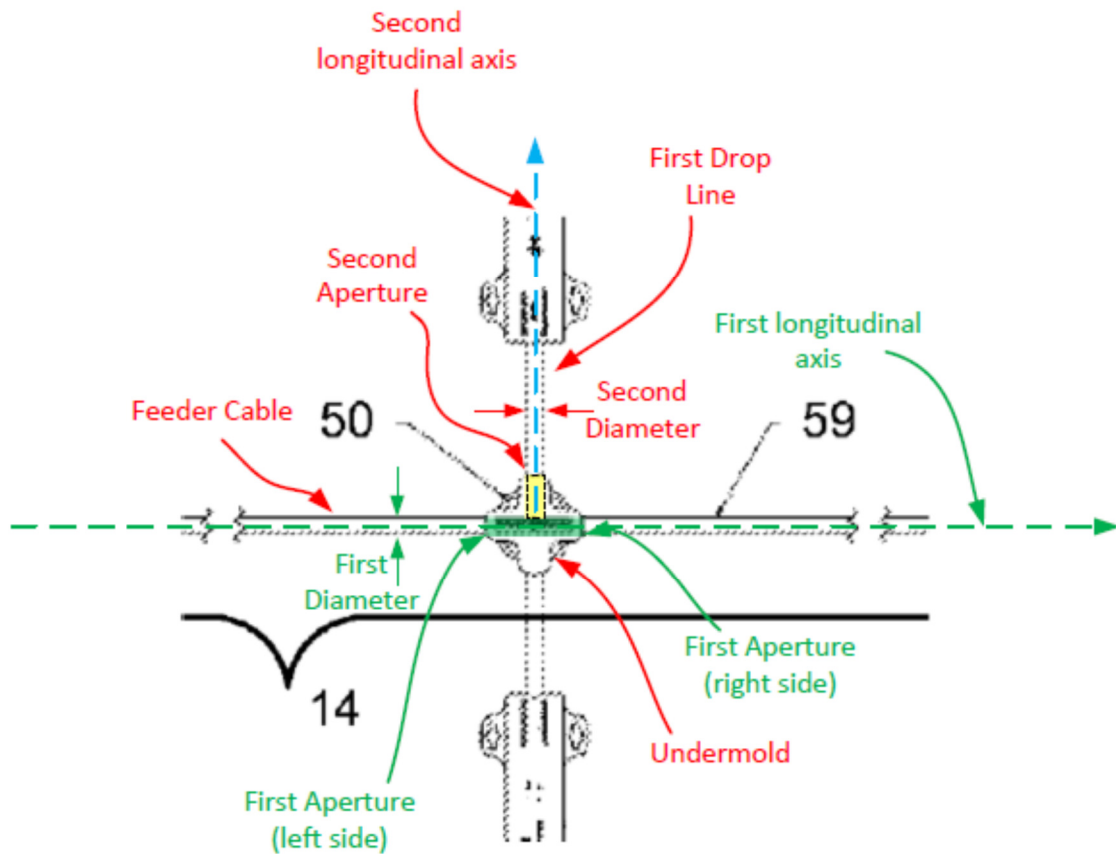
Although Solon741 does not specifically mention details of the cross joints (50), Solon741 incorporates by reference U.S. Application No. 12/502,395, which published as U.S. Patent Publication No. 2011/0011642 to Solon (“Solon642” EX1016). EX1005, ¶[0029]. Solon642 is prior art because it was published before the ’153 Patent priority date. The Examiner asserted Solon642 against dependent

claim 4 during the '153 Patent prosecution, which was not rebutted by the Applicant. Claim 4 is not challenged in this Petition based on prior art. Solon642 discloses design details regarding the cross joints (50). EX1016, ¶¶[0027]-[0030], FIGS.9A-9E; *Decl.* ¶[124]. Solon741 would motivate a POSITA to refer to Solon642 for the structure of the cross joints. *Decl.* ¶[124].

Thus, claim element 1(c)(i) is obvious based on Solon741 and incorporated publications. *Id.* ¶[125].

1(c)(ii)

Solon741 FIG. 3 discloses a second aperture (highlighted in yellow) extending partially through the undermold and having a second diameter different than the first diameter, with the drop line extending from the second aperture along a second longitudinal axis. *Id.* ¶[126]; EX1005, FIG. 3.



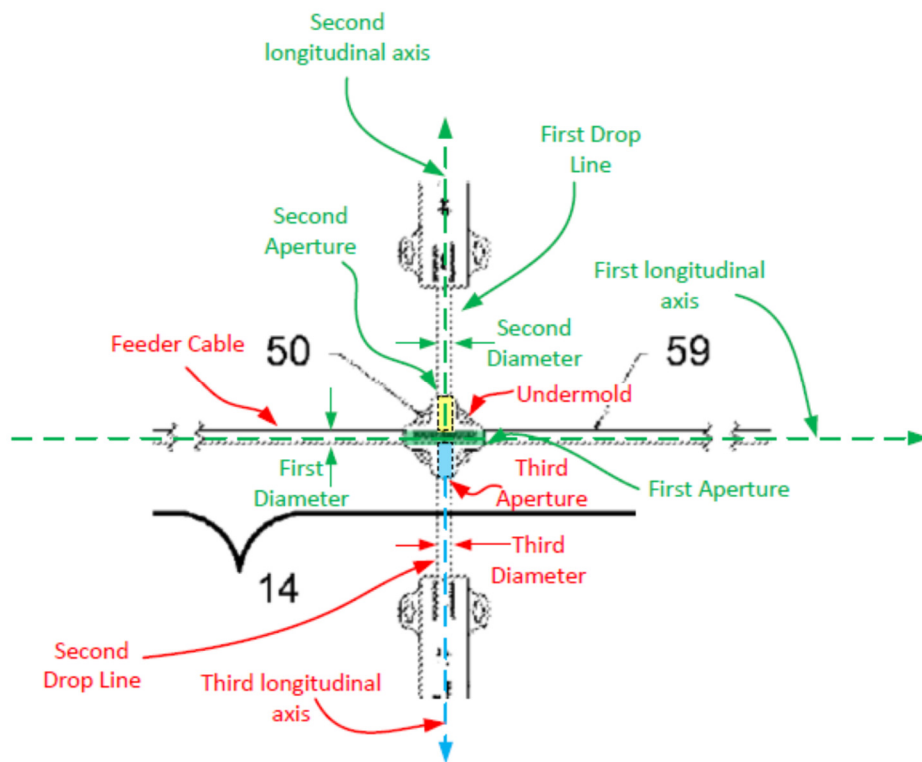
EX1005, FIG. 3 (Relief and 3rd-annotation)

FIG. 3 does not identify diameters of the cables and, thus, the first and second apertures. However, Solon741 discloses that the feeder cable (trunk 14) is “10 or 8 gauge photovoltaic wire” and the drop line (branch 12) is “10 or 12 gauge photovoltaic wire.” EX1005, ¶[0029]. A POSITA knows that 8 gauge wire has a larger diameter than 12 gauge wire, and therefore would understand Solon741 discloses that the diameter of the second aperture is smaller (i.e., different) than the first diameter of the first aperture. *Decl.* ¶[127].

Thus, Solon741 renders element 1(c)(ii) obvious. *Id.* ¶[129].

1(c)(iii)

FIG. 3 of Solon741 shows a third aperture (blue highlighting below) extending partially through the undermold and having a third diameter different than the first diameter, formed by the drop line extending from the third aperture along a third longitudinal axis. *Id.* ¶[130]; EX1005, FIG. 3.



EX1005, FIG. 3 (Relief and 4th-annotation)

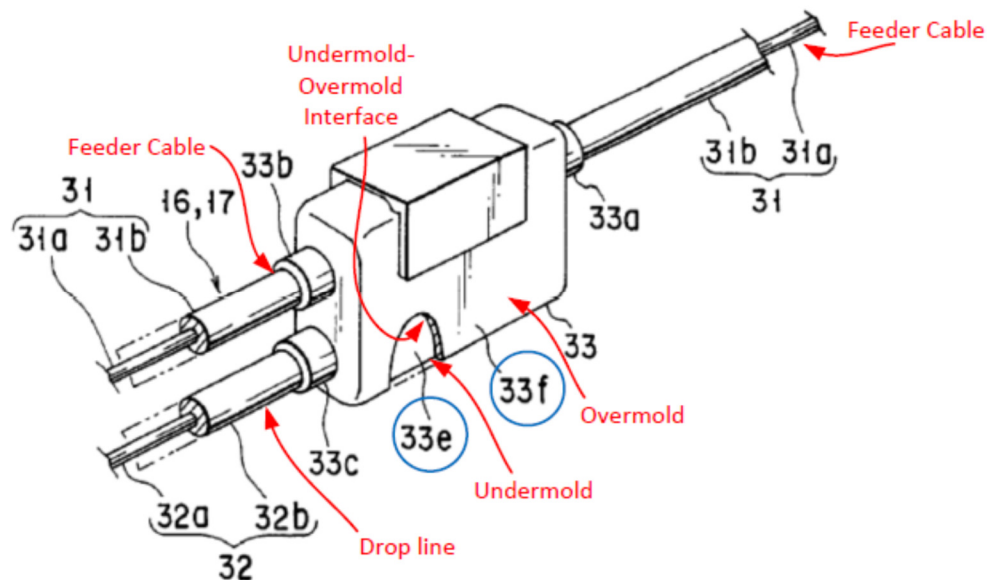
Solon741 discloses that the feeder cable (trunk 14) is a lower gauge (i.e., a thicker wire) than the drop lines (branches 12) of a higher gauge (i.e., a thinner wire). EX1005, ¶[0029]; *Decl.* ¶[131]. Thus, Solon741 renders element 1(c)(iii) obvious. *Decl.* ¶[133].

1(d)

Solon741 FIG. 3 shows a molded junction covering the wires at the nexus forming an undermold encasing the wire connections at the nexus (cross joint 50).

Decl. ¶[119].

Yamawaki FIG. 9B discloses applying an overmold over an undermold of a branch cable connection to provide an added layer of waterproofing. EX1006, 10:19-22,13:15-18; *Decl.* ¶¶[120],[134].



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

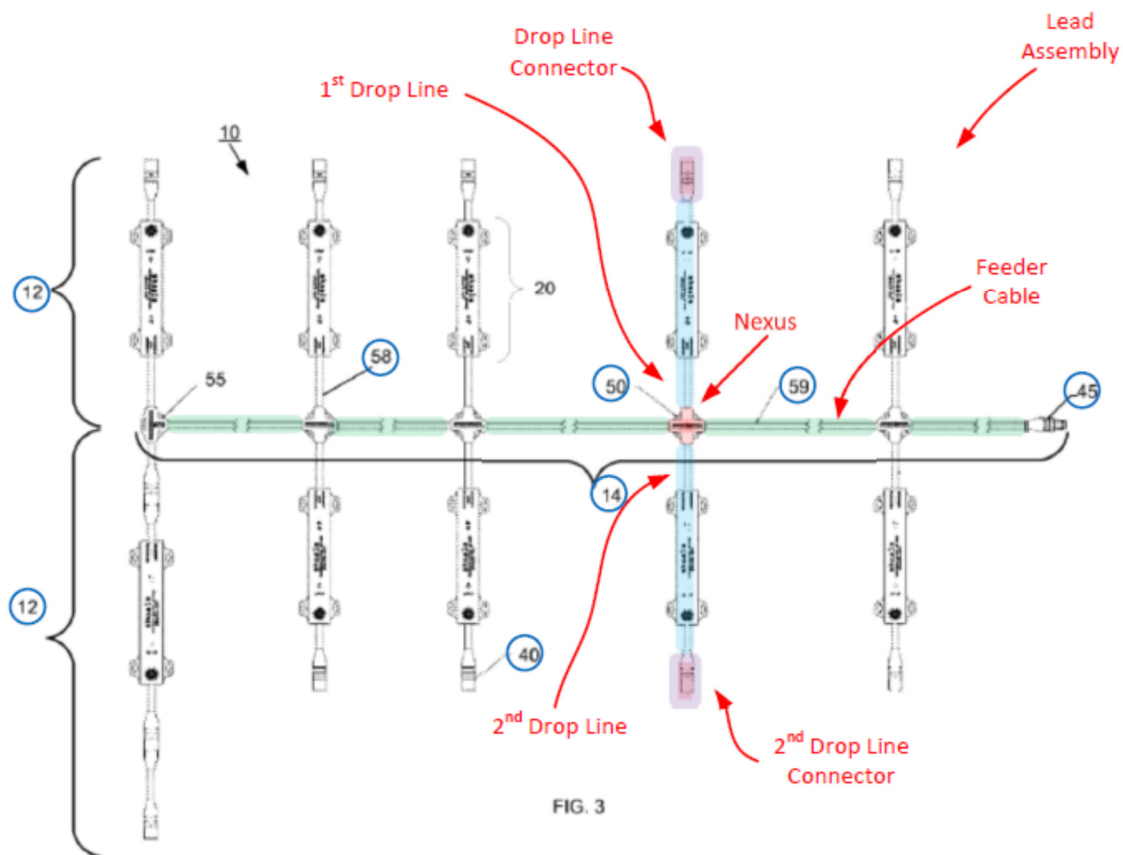
A POSITA would have been motivated to apply the overmolding taught in Yamawaki to the undermold of the nexus in Solon741 to better protect the electrical connections from the environment (e.g., waterproofing). *Decl.* ¶[135].

Thus, element 1(d) is obvious based on the Solon741-Yamawaki combination. *Id.*

Therefore, claim 1 is obvious based on the Solon741-Yamawaki combination. *Decl.* ¶[136].

2. Claim 5

Solon741 FIG. 3 shows the feeder cable (trunk 14) terminating at a feeder cable connector (connector 45). *Decl.* ¶[137]; EX1005, FIG. 3.



EX1005, FIG. 3 (1st-annotation)

Thus, claim 5 is obvious based on the Solon741-Yamawaki combination. *Decl.* ¶[138].

3. Claim 6

Although Solon741 does not disclose the feeder cable connector attached directly to an inverter, this wiring configuration was well known to POSITAs. *Decl.* ¶[139] (citing EX1011). For example, a POSITA would have been familiar with the NEC 2002 which illustrates in Figure 690.1(B) of a main feeder cable of a branching “photovoltaic source circuit” connected directly to an inverter. *Id.*, see EX1010, Fig. 690.1(B), p.544.

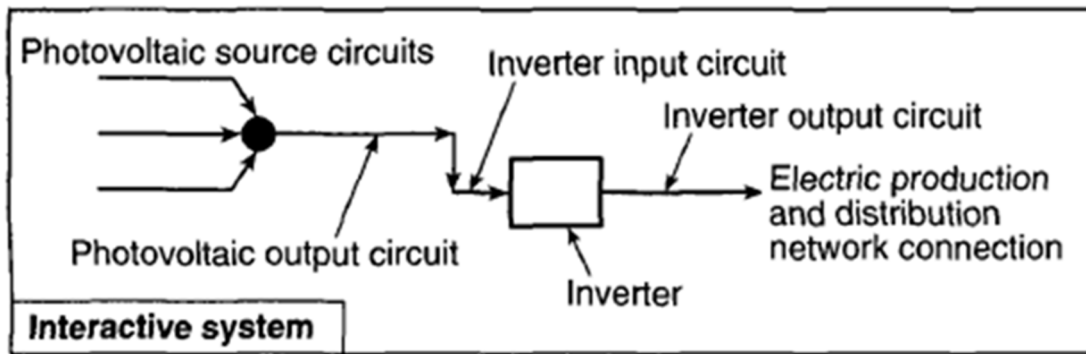


Figure 690.1(B) (top diagram)

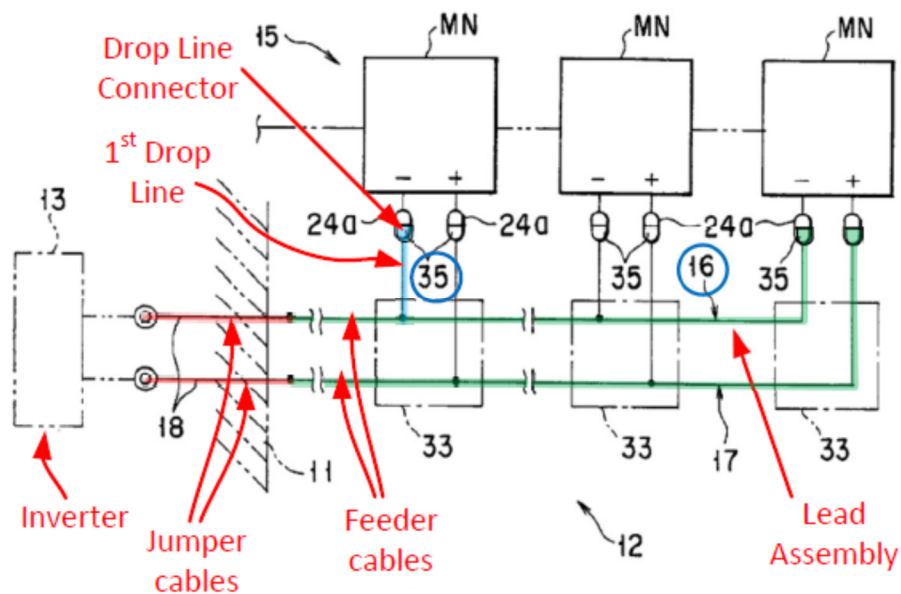
A POSITA would have been motivated to attach a feeder cable directly to an inverter, particularly for installations in which the inverter is in close proximity and can extend to be connected directly to feeder cable without the need for a jumper cable. *Decl.* ¶[140].

Thus, claim 6 is obvious based on the Solon741-Yamawaki combination. *Decl.* ¶[142].

4. Claim 7

Yamawaki FIG. 2 discloses attaching a feeder cable (16, 17) directly to a jumper cable (18) that connects to an inverter (13). EX1006, 7:45-8:11; *Decl.*

¶[143]. A POSITA would have been motivated to attach a feeder cable disclosed in Solon741 to a jumper cable for connecting to an inverter as taught by Yamawaki to simplify installation, such as when routing cables through a structure as illustrated in FIG. 2. *Decl.* ¶[145].

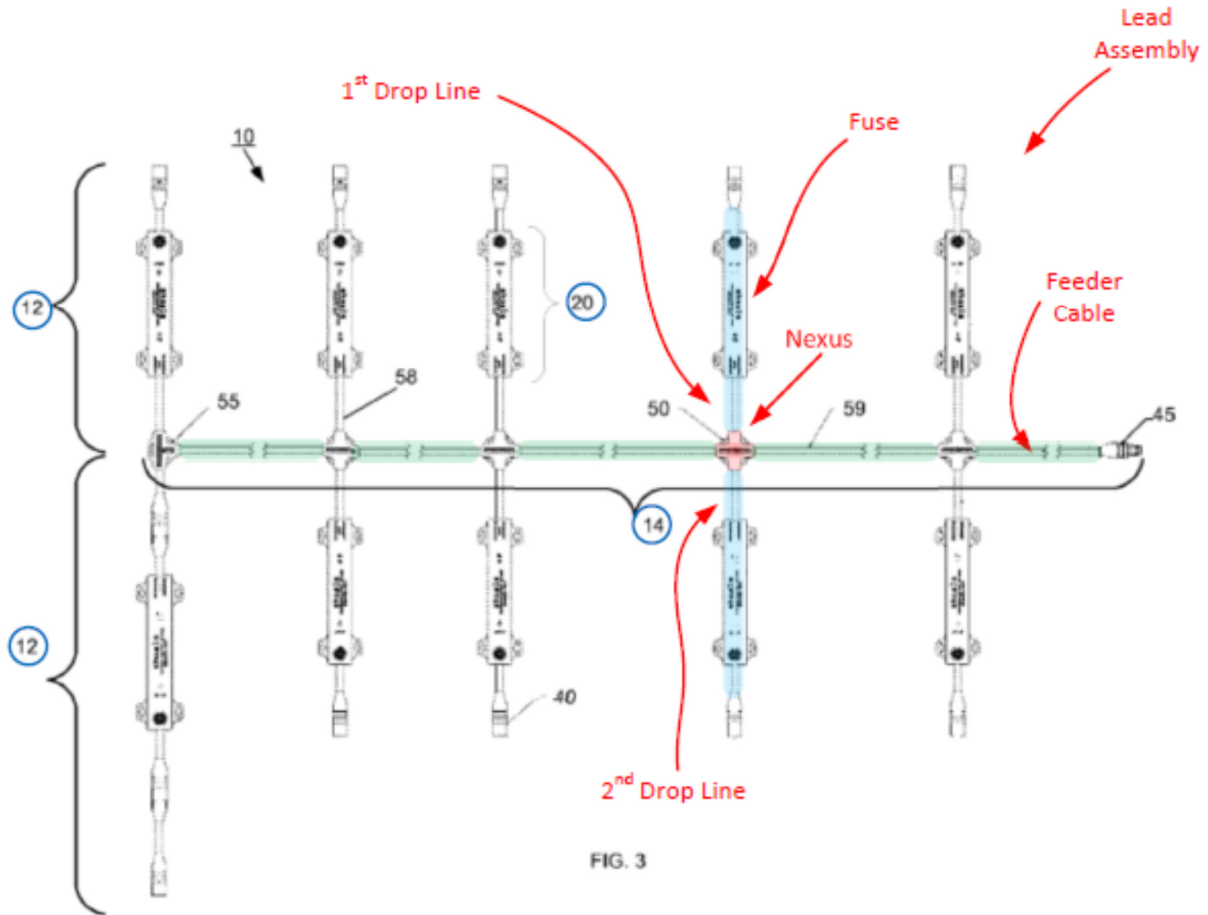


EX1006, FIG. 2 (1st-annotation)

Thus, claim 7 is obvious based on the Solon741-Yamawaki combination.
Decl. ¶[146].

5. Claim 11

Solon741 FIG. 3 discloses that the drop lines (branches 12) include an inline fuse (20). EX1005, ¶[0030], p.10. *Decl.* ¶[147].



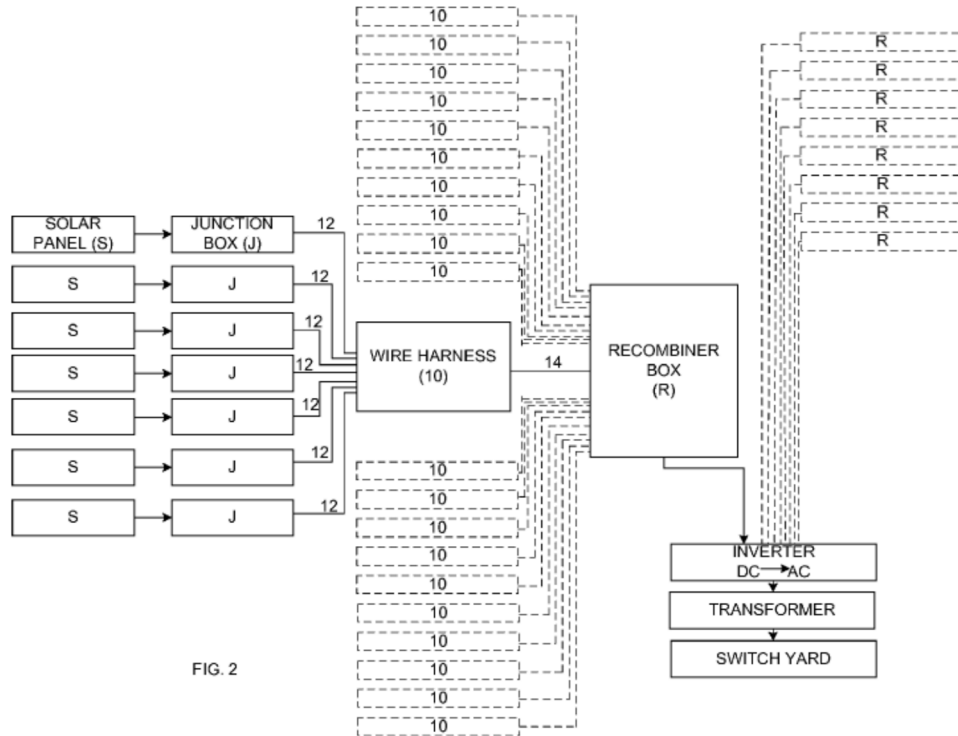
EX1005, FIG. 3 (2nd-annotation)

Thus, claim 11 is obvious based on the Solon741-Yamawaki combination.

Decl. ¶[147].

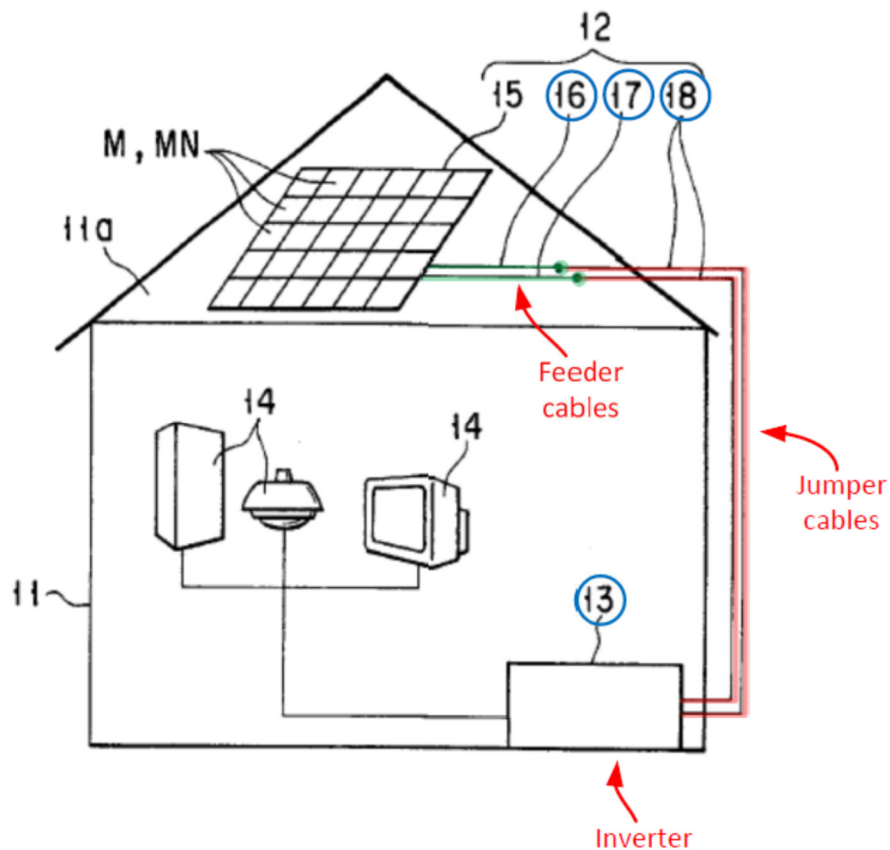
6. Claim 12

Solon741 discloses a lead assembly (14) for a solar energy installation that combines power received from a plurality of solar panels (S) and conducts the power directly to an inverter electrically connect to the feeder cable (14) as shown in annotated FIGS. 2 and 3 below. EX1005, FIG 2; *Decl.* ¶[149].

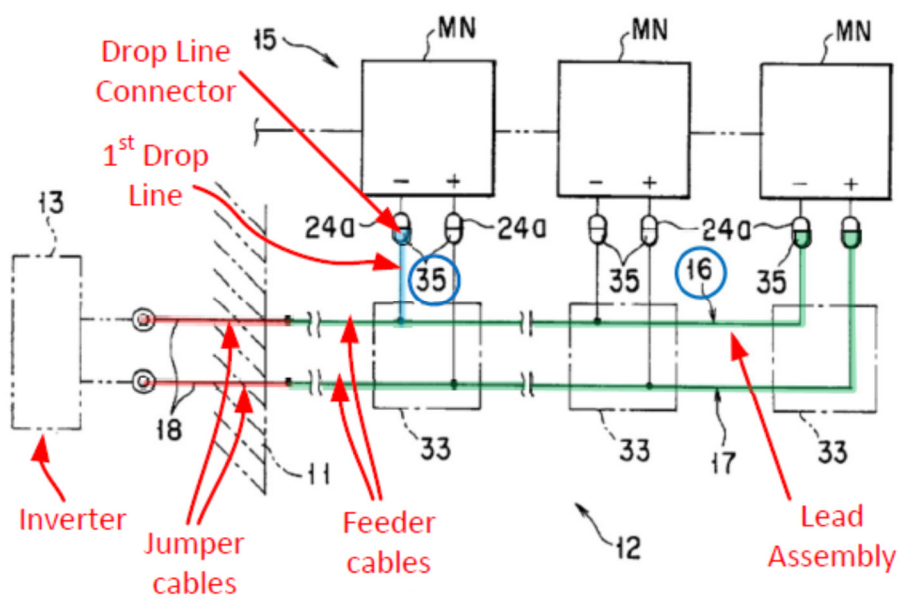


EX1005, FIG. 2

Also, as discussed regarding claim elements 1(a), 1(b), and claim 7, Yamawaki discloses attaching a feeder cable to a jumper cable that connects to an inverter as shown in Yamawaki FIGS. 1 and 2. EX1006, 7:45-8:11; *Decl.* ¶[149].



EX1006, FIG. 1 (1st-annotation)



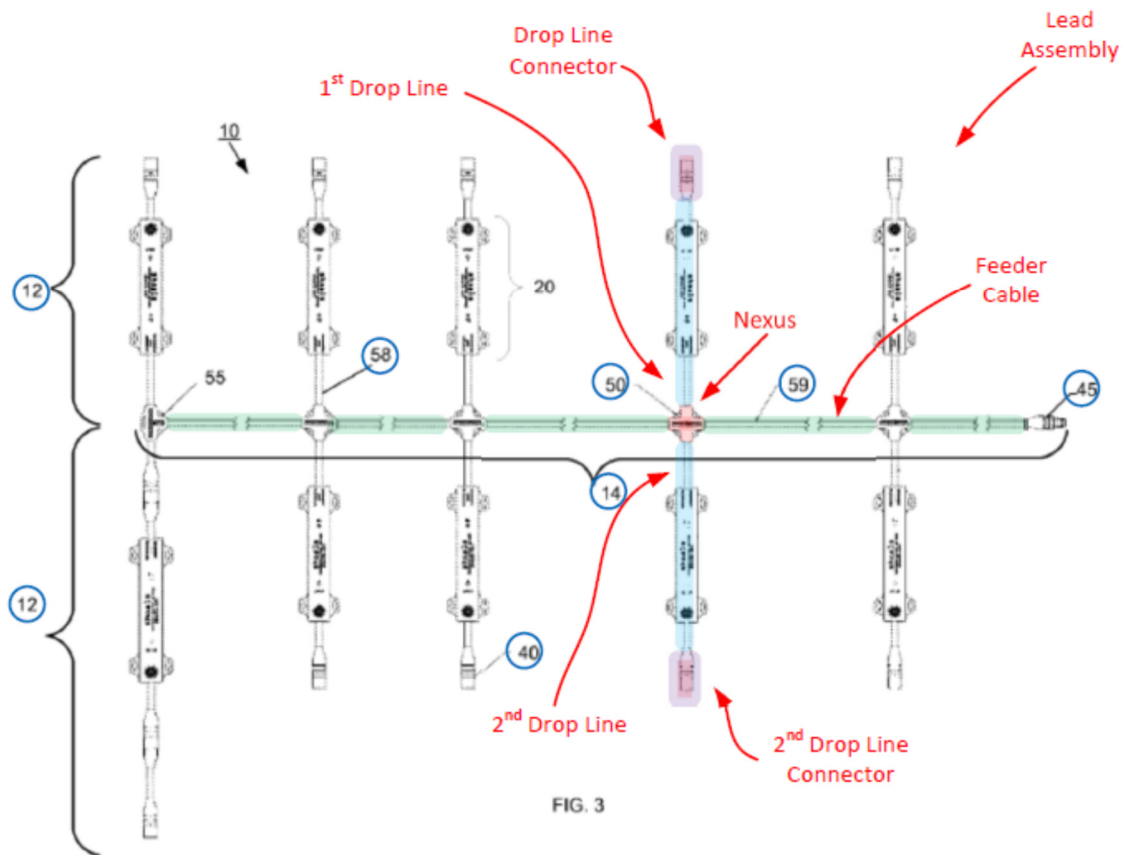
EX1006, FIG. 2 (1st-annotation)

Thus, claim 12 is obvious based on the Solon741-Yamawaki combination.

Decl. ¶[150].

7. Claim 13

Solon741, FIG. 3 discloses a second drop line (blue below) terminating at a second drop line connector (pink below). EX1005, *See* ¶[0029]; FIG. 3 (1st-annotation); *Decl.* ¶[151].



EX1005, FIG. 3 (1st-annotation)

As discussed regarding claim element 1(a), a POSITA would have been motivated to connect wire harnesses of Solon741 to intermediate wire harnesses as taught by Yamawaki as a practical way to combine currents from multiple panels.

Decl. ¶[152]. Each of the drop line connectors, including the second drop line connector disclosed in Solon741, is configured to connect to the central trunk of a second wire harness, with the central trunk of the second wire harness having a plurality of branches each of which are configured to electrically connect to a separate solar panel contained in a second array of a plurality of solar panels. *Id.*, *see* EX1005, ¶[0037] and FIGS. 2 and 3.

Accordingly, claim 13 is obvious based on the Solon741-Yamawaki combination. *Decl.* ¶[153].

8. Claim 14

Claim 14 is obvious based on the Solon741-Yamawaki combination for the reasons explained in Ground 1, claims 7, 12, and 13. *Decl.* ¶[154].

9. Claim 16

Solon741 discloses that drop lines (branches 12) are “constructed of 10 or 12 gauge photovoltaic wire,” which falls within the range of four and eighteen gauge. EX1005, ¶[0029]; *Decl.* ¶[155].

Thus, claim 16 is obvious based on the Solon741-Yamawaki combination. *Decl.* ¶[156].

10. Claim 17

“MCM” stands for “thousands of circular mils,” which defines wire sizes. A

250 MCM cable has a diameter greater than 1cm, and a 1000 MCM cable has a diameter near 2.5 cm. Following standard electrical practices, a POSITA would have known how to select an appropriate feeder cable gauge based on the projected current carried by the feeder cable, and could determine that cables with 250 to 1000 MCM diameter will carry current from 215A to 455A. *Decl.* ¶[157] (citing EX1010). Therefore, a POSITA would understand that the selection of feeder cables in the range of 250 MCM to 1000 MCM is an obvious design choice in view of Solon741 and well-known electric codes and standards including the National Electric Code (NEC) 2002. EX1010; *Decl.* ¶[158].

Thus, claim 17 is obvious based on the Solon741-Yamawaki combination. *Decl.* ¶[159].

11.Claim 21

Preamble

See Ground 1, claim element 1(Preamble) and Solon741 FIG. 5 disclosing a solar power system. *See* EX1005, FIG. 2; *Decl.* ¶[162].

21(b)(iv)

See claim element 1(c) and claim 18. *Id.* ¶[169]-[170]. Note that “primary mold” recited in claim 21 has the same meaning as “undermold” in claim 1. *See* IV. E. Claim Construction.

21(b)(iv)(1)- 21(b)(iv) (3)

See Ground 1, elements 1(c)(i), 1(c)(ii), and 1(c)(iii). Also, reciting that two apertures have different diameters implies a comparison where one aperture must necessarily have a smaller diameter than the other. *Id.* ¶[171].

Therefore, claim 21 is obvious based on the Solon741-Yamawaki combination.

12.Claim 22

See Ground 1, claims 6, 7, 12, and 14. *Id.* ¶[172].

13.Claim 23

See Ground 1, claim element 1(d). *Id.* ¶[173].

14.Claim 24

Preamble

See Ground 1, claim element 1(Preamble) and 21(Preamble). *Id.* ¶[174].

24(a)

See Ground 1, claim element 1(a). *Id.* ¶[175].

24(b)

See Ground 1, claim element 1(Preamble) and 21(Preamble). *Id.* ¶[176].

24(b)(i)

See Ground 1, claim element 1(a). *Id.* ¶[177].

24(b)(ii)

See Ground 1, claim element 1(b). *Id.* ¶[178].

24(b)(iii)

See Ground 1, claim element 1(c) and claim 18. *Id.* ¶[179]. Note that “primary mold” recited in claim 24 has the same meaning as “undermold” in claim 1. *See* IV. E. Claim Construction.

24(b)(iii)(1)

See Ground 1, claim element 1(c)(i). *Id.* ¶[180].

24(b)(iii)(2)

See Ground 1, claim element 1(c)(ii). *Id.* ¶[181].

24(b)(iv)

See Ground 1, claim elements 1(c)(iii). *Id.* ¶[182].

Therefore, claim 24 is obvious based on the Solon741-Yamawaki combination. *Id.* ¶[183].

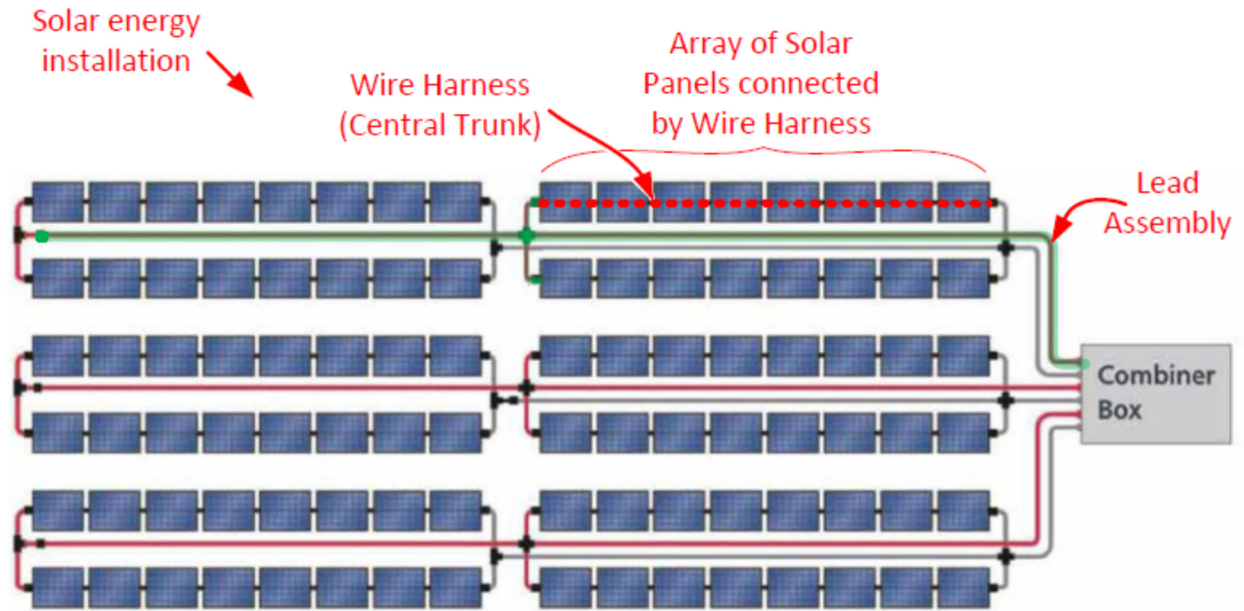
B. Ground 2: Claims 1-3, 5-19, and 21-24 are unpatentable under 35 U.S.C. § 103 as obvious in view of Amphenol, Shao, and Yamawaki.

• Motivation to Combine Amphenol and Shao

A POSITA would have been motivated to combine Amphenol with Shao

(i.e., the “Amphenol-Shao combination”) for the following reasons.

Both Amphenol and Shao address the general problem of providing convenient, flexible, reliable, and low-cost wiring assemblies. *Decl.* ¶[184]. Amphenol relates to 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. *See* EX1007, generally. Shao discloses power cable components, particularly the detailed design of a cable junction (i.e., branch) to be used for power distribution. *See* EX1008, Abstract. Further, both Amphenol and Shao are analogous prior-art to the ’153 Patent because they are directed to wiring assemblies like those claimed in the ’153 Patent. Therefore, a POSITA charged with designing or fabricating a solar power system and solving the problems of power distribution addressed in the ’153 Patent, would be aware of and motivated to consider both Amphenol and Shao. *Decl.* ¶[197]-[199].

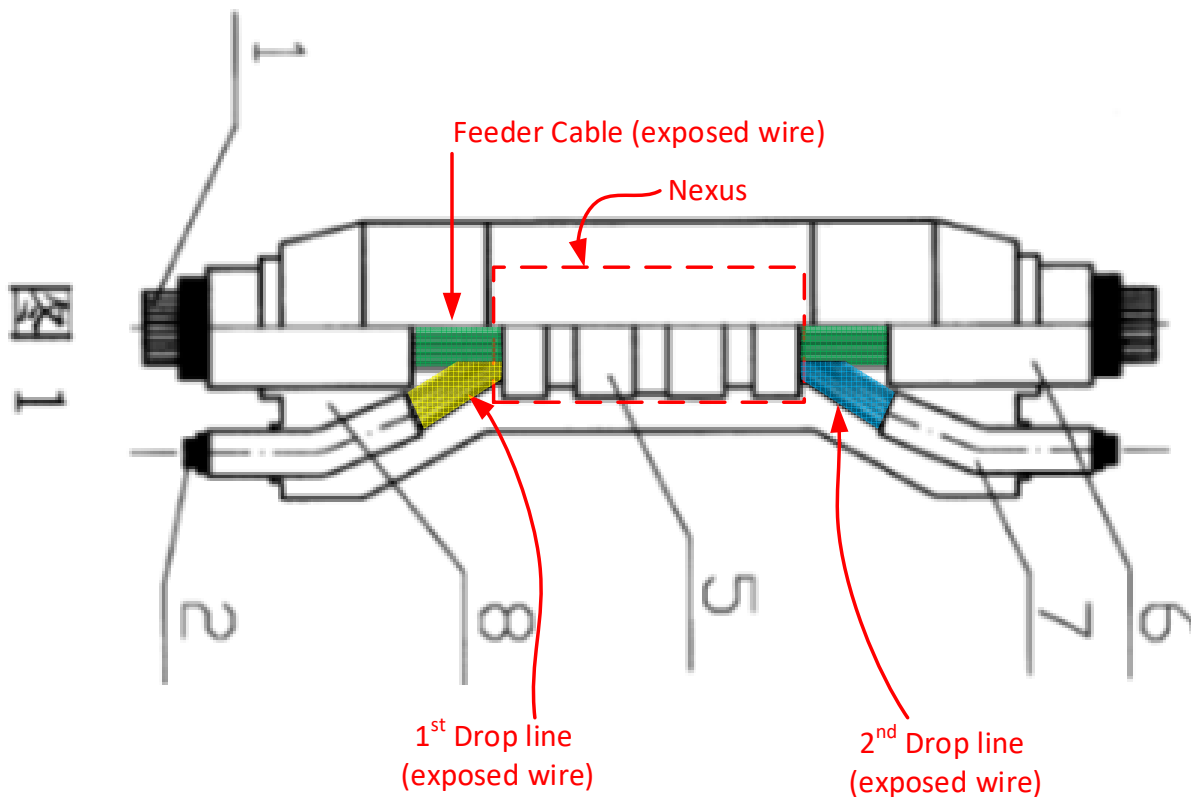


EX1007, p.5, middle image (1st-annotation)

A POSITA would have been motivated to modify the cross junctions of the lead assembly (the red or gray cabling partially annotated **green**, above) taught by Amphenol with the teachings of Shao for multiple reasons. First, Shao teaches a k-branch connector design that provides a POSITA with additional guidance for designing and fabricating the cross junctions disclosed in Amphenol. *See* EX1008, EX1008, FIG. 1 (1st-annotation, below); *Decl.* ¶¶[194],[196]. Second, Shao discloses details associated with overlapping and crimping the main cable and drop lines that can be used in the cross junction of Amphenol including the use of an extended copper C-shaped clamp to ensure electrical contact (i.e., conductivity) and mechanical joining between the feeder cable and the drop lines. *Decl.* ¶[197]. Third, Shao's k-shaped connector eliminates extra branch joints and provides a

low-profile and compact design, which can avoid having branch cables with sharp bends that compromise cable integrity. *See* EX1008, 5:27-31; *Decl.* ¶[197].

Fourth, Shao discloses using insulation layers and injection molding to form the packaging around the nexus of the cables, which provides enhanced protection from environmental factors (e.g., moisture) to the solar wire assemblies of Amphenol. *See id.*, 5:37-40; *Decl.* ¶[197].



EX1008, FIG. 1 (1st-annotation)

Amphenol and Shao are not cumulative references because Amphenol focuses on cable assemblies, connectors, tools, and accessories, while Shao addresses the details of the cable junctions where branch lines connect to a main

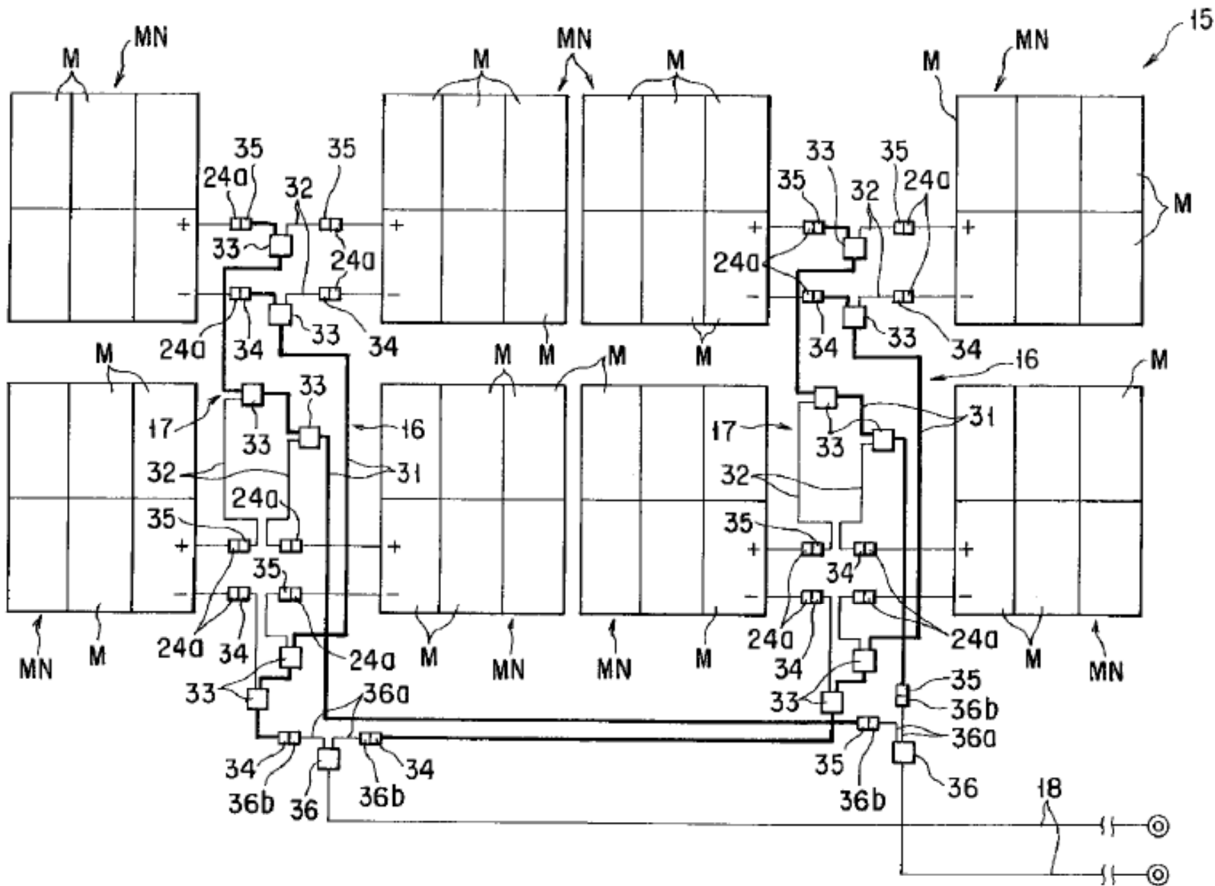
trunk cable. *Decl.* ¶[195].

Finally, a POSITA would have an expectation of success in combining the teachings of Amphenol and Shao because the components are variations of well-known wiring components designed for use in the same applications and do not involve unpredictable technology. *Id.*, ¶[200].

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

A POSITA would have been motivated to combine Amphenol, as modified by Shao, with Yamawaki (i.e., the “Amphenol-Shao-Yamawaki combination”) for the following reasons.

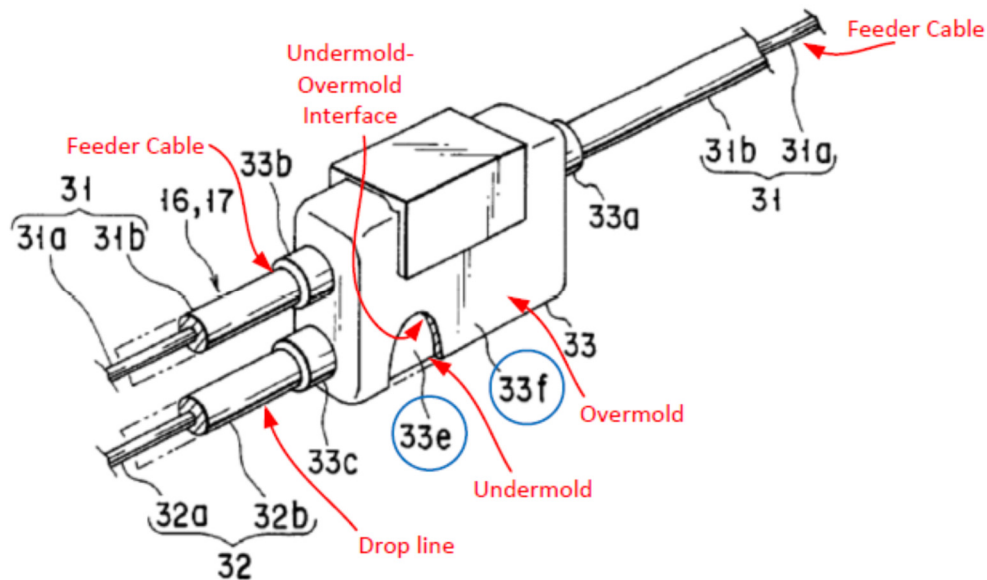
Amphenol, Shao, and Yamawaki all disclose cable assemblies with branching junctions. *Decl.* ¶[203]. As discussed above, the Amphenol-Shao combination discloses an enhanced lead assembly with a compact protective insulating case that may be used in a solar energy installation. *Id.* Yamawaki discloses photovoltaic systems with various wiring structures (*see* Yamawaki, FIG. 3, below). *Id.* Amphenol and Yamawaki are analogous prior art to the ’153 Patent because they are both directed to solar power wiring assemblies like those claimed in the ’153 Patent. *Id.* Therefore, a POSITA charged with designing a solar power system and solving the power distribution problems addressed in the ’153 Patent, would be aware of and motivated to consider Amphenol, Shao, and Yamawaki. *Decl.* ¶[204].



EX1006, FIG. 3

A POSITA would have been motivated to combine the wiring cables, harnesses and connectors of Amphenol, as modified by Shao, in series and coupled to an inverter as taught by Yamawaki for multiple reasons. First, Yamawaki teaches that it was known to include wire harnesses coupled to other wire harnesses and cable assemblies for combining the current from solar panels to deliver to a common connection point. *See* EX1006, FIG. 3, above; *Decl.* ¶[203]. Second, Yamawaki discloses photovoltaic generation systems connected to an inverter via a jumper cable. EX1006, 7:45-8:11, FIGS. 1-2; *Decl.* ¶[203]. Additionally, A

POSITA would have been motivated to applying an overmold over an undermold of a branch cable connection, as taught by Yamawaki, to provide an added layer of waterproofing. EX1006, 10:19-22,13:15-18, FIG. 9B (1st-annotation, below); Decl. ¶[204].



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

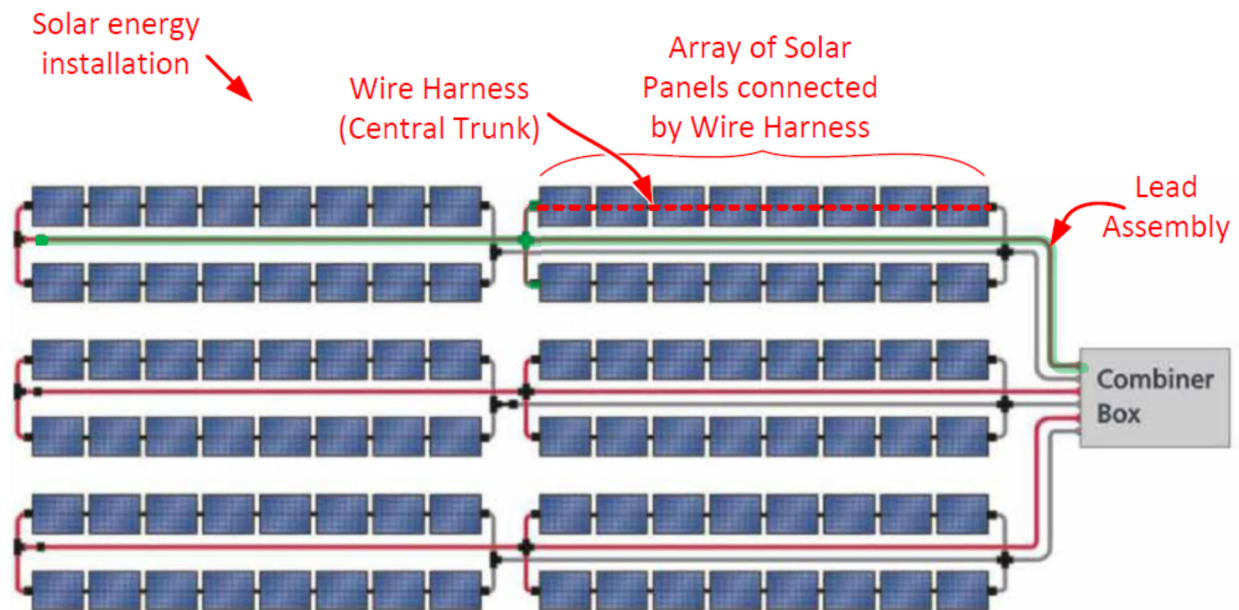
Amphenol, Shao, and Yamawaki are not cumulative references because Amphenol focuses on cable assemblies, connectors, tools, and accessories, Shao addresses the details of the cable junctions, and Yamawaki addresses the different and broader aspects of solar power installations. Decl., ¶[206].

A POSITA would have had an expectation of success in combining the Amphenol-Shao combination and Yamawaki because the components are versions of well-known photovoltaic and more general electrical circuits designed for use in the same applications and do not involve unpredictable technology. Decl., ¶[206].

1. Claim 1

Preamble

Amphenol discloses a lead assembly (annotated green) for use in a solar energy installation. EX1007, p.5; *Decl.* ¶[207].

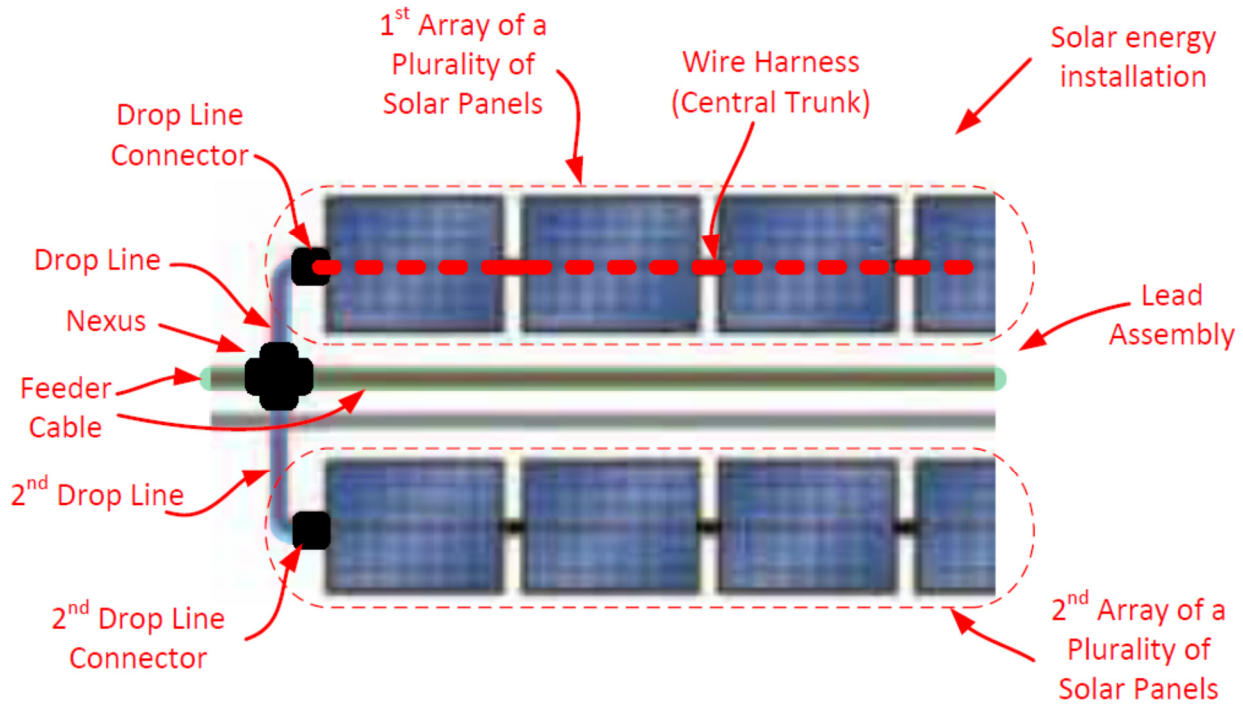


EX1007, p.5, middle image (1st-annotation)

Thus, Amphenol renders claim element 1(Preamble) obvious.

1(a)

Amphenol discloses two drop lines (annotated blue) off a feeder cable (annotated green) of the lead assembly, where each drop line terminates in a drop line connector. EX1007, p.5; *Decl.* ¶[211].



EX1007, p.5, middle image (Relief & 2nd-annotation)

Additionally, Amphenol discloses that the drop line connector is connected to a central trunk of a wire harness (**red dotted line**). *Decl.* ¶[212]. A POSITA would understand that the central trunk of Amphenol's wire harness has a plurality of branches that each electrically connects to separate solar panel modules that together are a part of an array of a plurality of solar panels. *See id.*

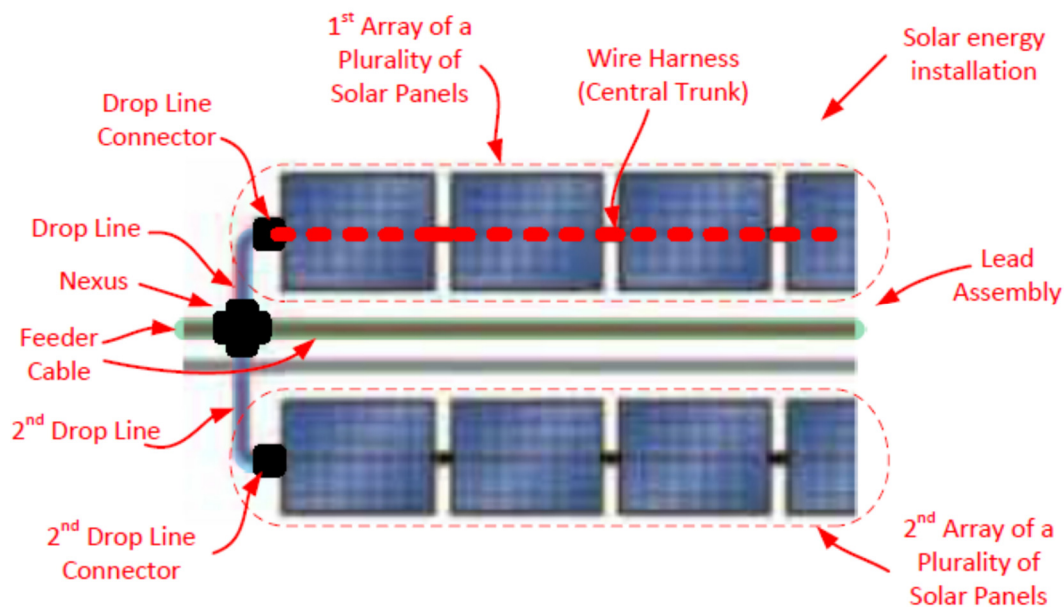
As discussed in Ground 1, Yamawaki discloses that it was known to include wire harnesses coupled to other wire harnesses and cable assemblies for combining the current from solar panels to deliver to a common connection point. *Decl.* ¶[110]. A POSITA would understand that the various different arrangements for solar installations disclosed by Yamawaki could be applied as needed for a particular installation. EX1006, 8:15-20 and FIG.3; *Decl.* ¶[214]. Also, a

POSITA would understand that the arrangement of wiring assemblies disclosed by Yamawaki can be extended and combined with Amphenol to efficiently form a solar installation. *Decl.* ¶[215].

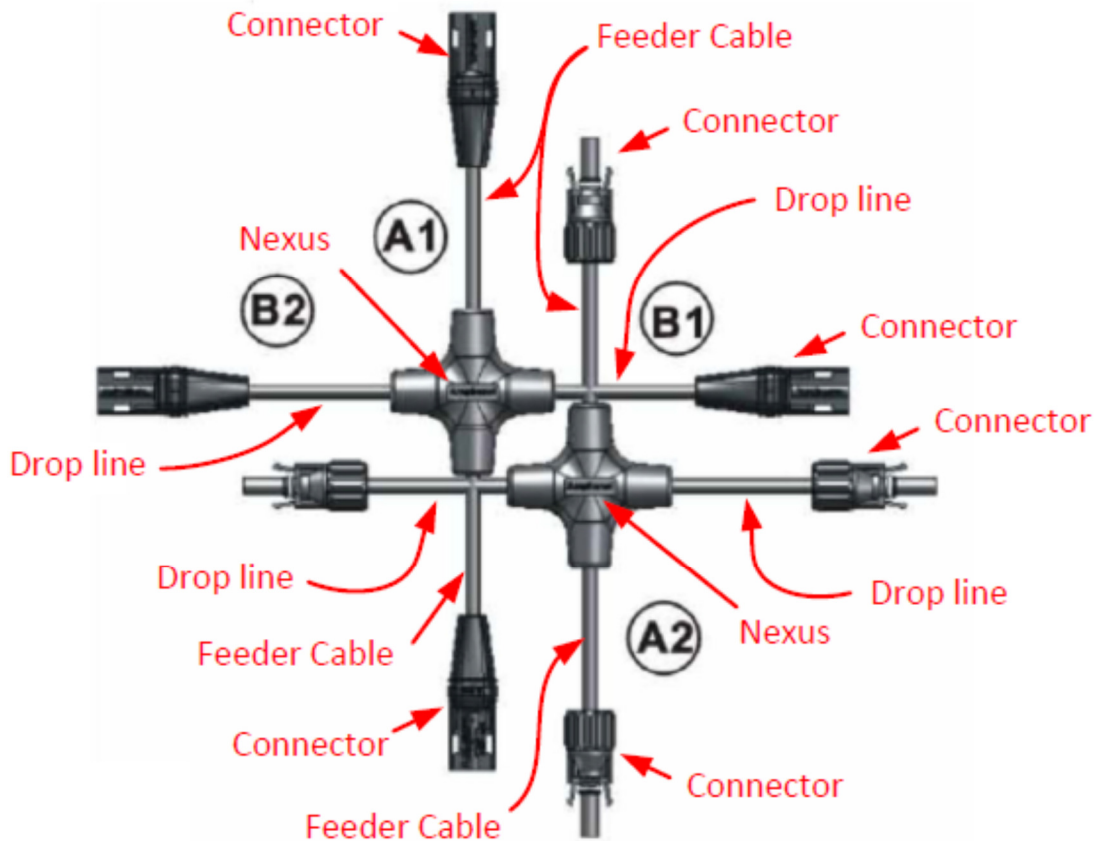
Thus, claim element 1(a) is obvious based on Amphenol, Shao, and Yamawaki.

1(b)

Amphenol discloses a feeder cable (i.e., a “**main cable**”) electrically coupled to the drop line (i.e., a “**branch cable**”) at a nexus. EX1007, pp.5,13; *Decl.* ¶[219].

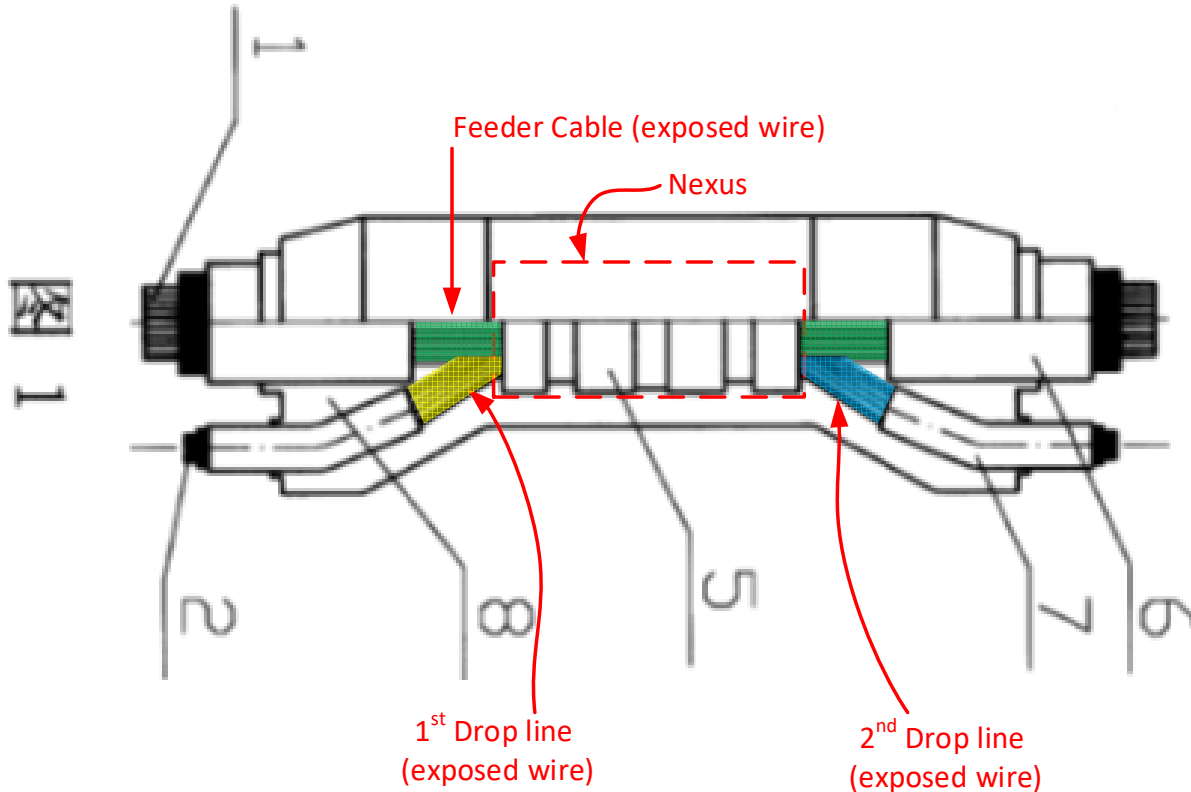


EX1007, p.5, middle image (Relief & 2nd-annotation)



EX1007, p.13, bottom image (1st-annotation)

Shao teaches details of the feeder cable's electrical coupling to the drop line at the nexus. *Decl.* ¶[220]. Shao discloses a feeder cable (**trunk conductor 1**) electrically coupled to the drop line (**branch-line conductor 2**) at a nexus that includes a clamp (connector 5). *See* EX1008, FIG.1, *Decl.* ¶[221]. A POSITA would be motivated to use the coupling design of Shao to ensure a proper electrical connection for the junctions of Amphenol. *Id.*



EX1008, FIG. 1 (1st-annotation)

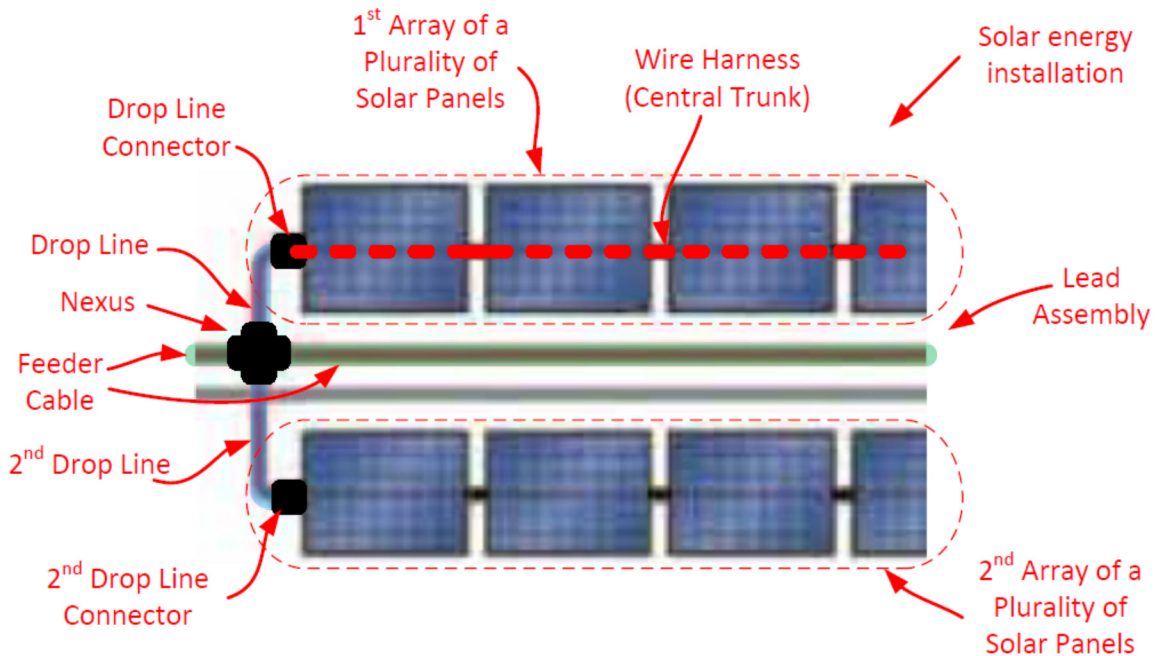
Thus, claim element 1(b) is obvious based on the Amphenol-Shao-Yamawaki combination.

1(c)

As discussed in the Claim Construction, a POSITA would understand that "undermold" means a "material molded over a piece or part that seals against environmental factors." *Decl. ¶[223], see E. Claim Construction, supra.*

The molded junction covering the wiring and union of the various forms of nexus in Amphenol is an undermold that fully encases the nexus since the molded junction covering the nexus may serve as a substrate for an overmold. EX1007,

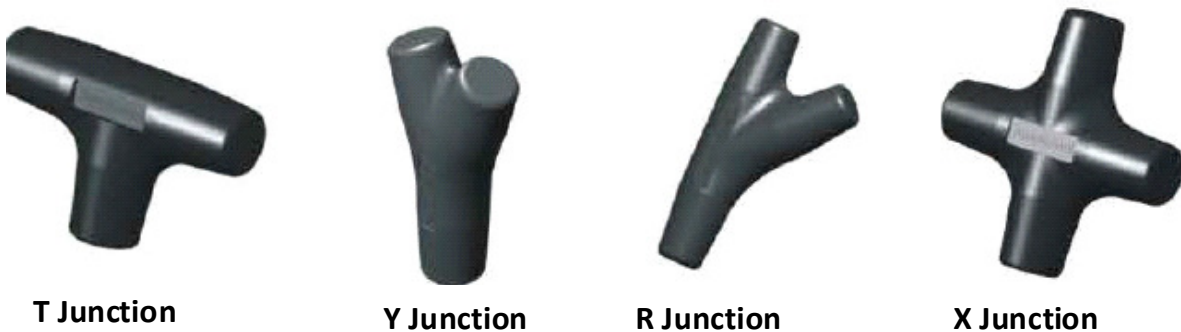
p.5; *Decl.* ¶[224].



EX1007, p.5, middle image (Relief & 2nd-annotation)

Amphenol discloses various different types of molded junctions (i.e., undermolds) that may be used to enclose a nexus. EX1007, p.5; *Decl.* ¶[225].

Cable Assy and Diversity Junctions



EX1007, p.5, bottom image

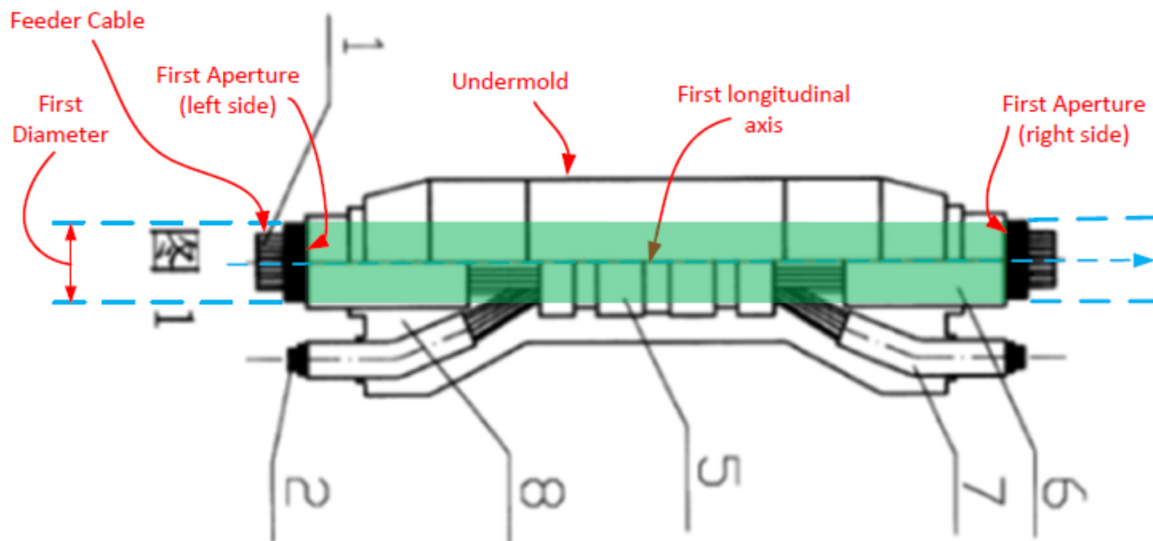
Shao discloses a feeder cable electrically coupling to drop lines at a nexus that is covered by a sheath made of injection molding material, which is an

undermold that fully encases the nexus. EX1008, 5:16-20; *Decl.* ¶[226]. A POSITA would have been motivated to use the undermold design of Shao to properly seal the exposed cables and the metal clamp holding them together, protecting those elements from damage and/or exposure, while providing a compact design. (see “Motivation to Combine Amphenol and Shao” above). *Decl.* ¶[197].

Thus, claim element 1(c) is obvious based on the Amphenol-Shao-Yamawaki combination.

1(c)(i)

Shao discloses a first aperture extending completely through the undermold and having a first diameter, wherein the feeder cable extends through the first aperture along a first longitudinal axis. EX1008, FIG.1; *Decl.* ¶[231].

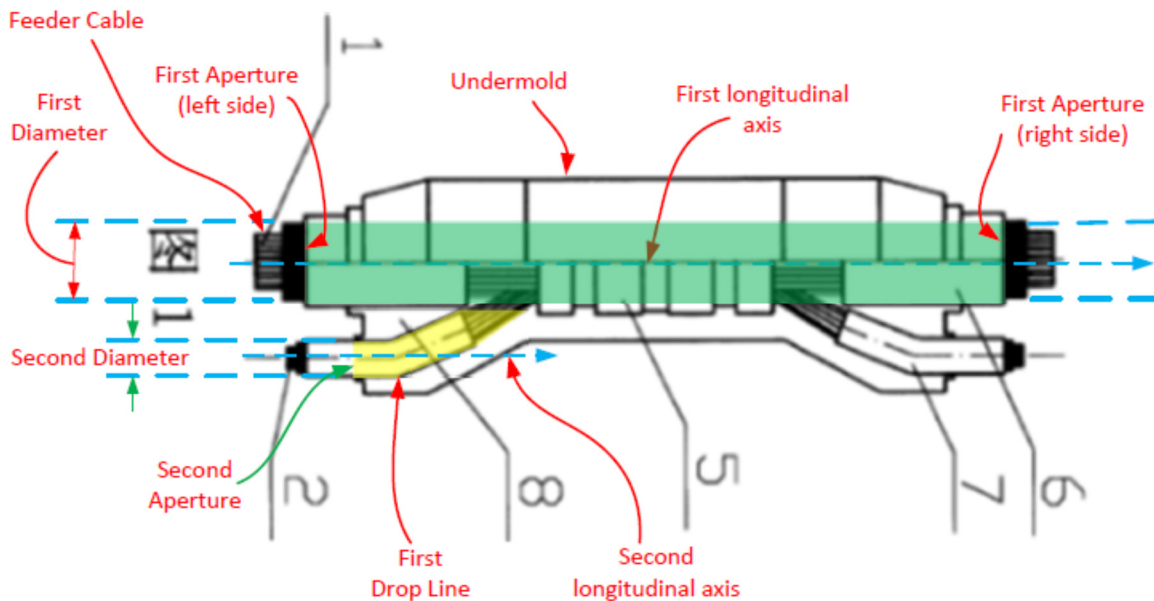


EX1008, FIG. 1 (2nd-annotation)

Thus, claim element 1(c)(i) is obvious based on the Amphenol-Shao-Yamawaki combination.

1(c)(ii)

Shao discloses a second aperture extending partially through the undermold and having a second diameter different than the first diameter, wherein the drop line extends from the second aperture along a second longitudinal axis. EX1008, FIG.1; *Decl.* ¶[235].



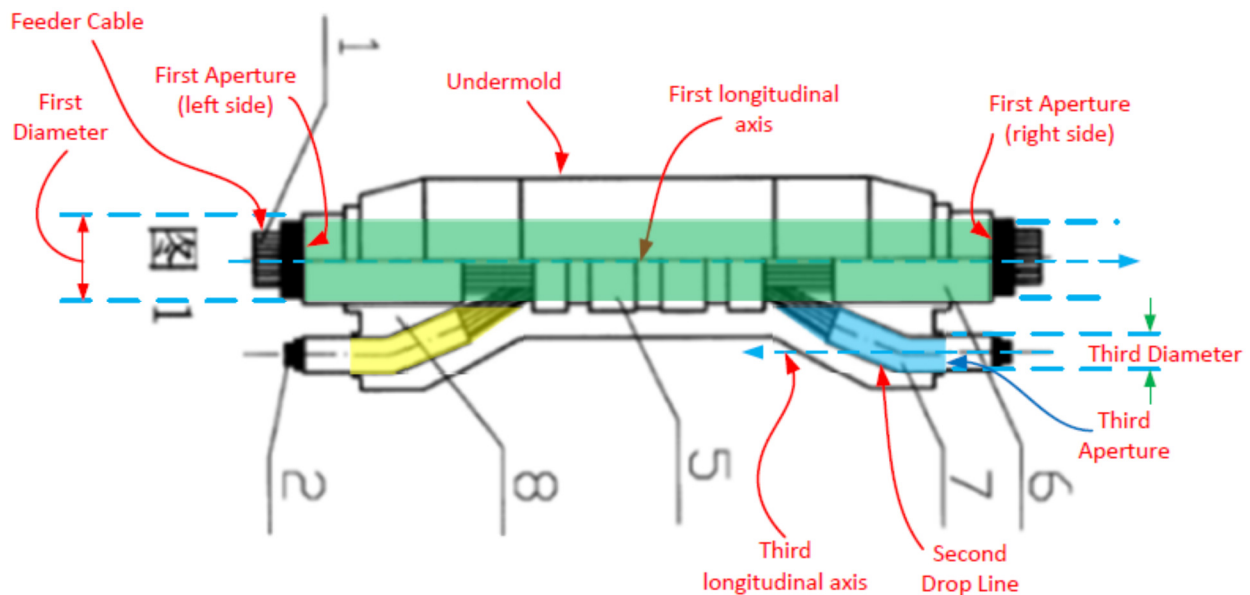
EX1008, FIG. 1 (3rd-annotation)

Thus, claim element 1(c)(ii) is obvious based on Amphenol and Shao. *Decl.* ¶[237].

1(c)(iii)

Shao discloses a third aperture extending partially through the undermold

and having a third diameter different than the first diameter, wherein a second drop line extends from the third aperture along a third longitudinal axis. EX1008, FIG.1; *Decl.* ¶[239].



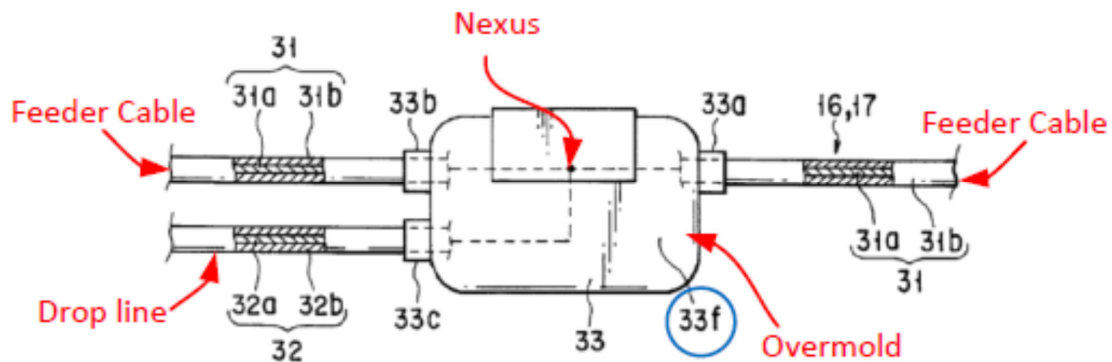
EX1008, FIG. 1 (4th-annotation)

Thus, claim element 1(c)(iii) is obvious based on the Amphenol-Shao-Yamawaki combination.

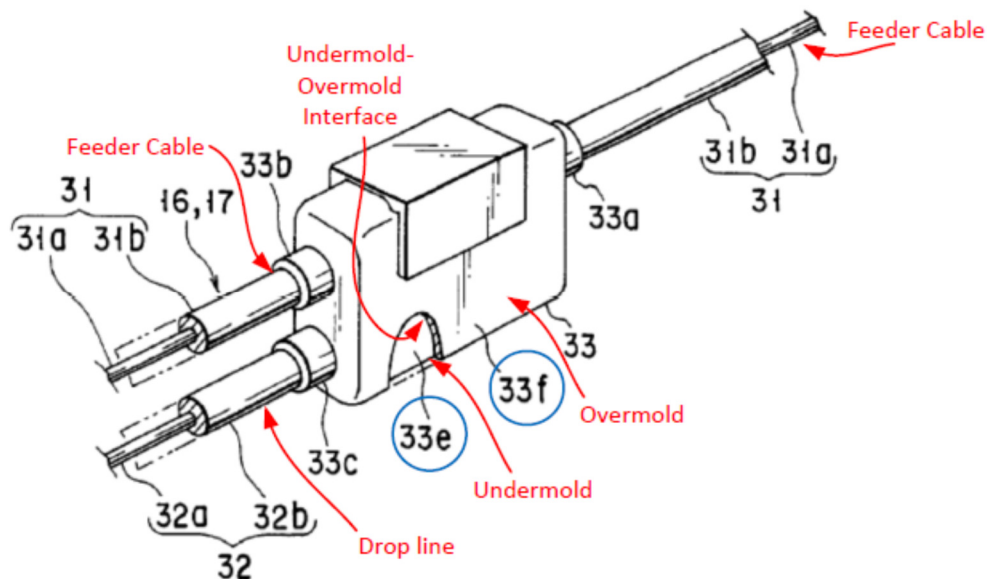
1(d)

Yamawaki teaches applying an overmold over an undermold of a branch cable connection to provide an added layer of waterproofing. EX1006, 10:19-22,13:15-18; *Decl.* ¶[242]. Specifically, Yamawaki discloses applying an overmold (i.e., covering member 33f) over the undermold (i.e., molded underbody 33e) covering a branch junction (i.e., a nexus) of cables (i.e., a feeder cable and a

branch cable). *See id.*



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



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

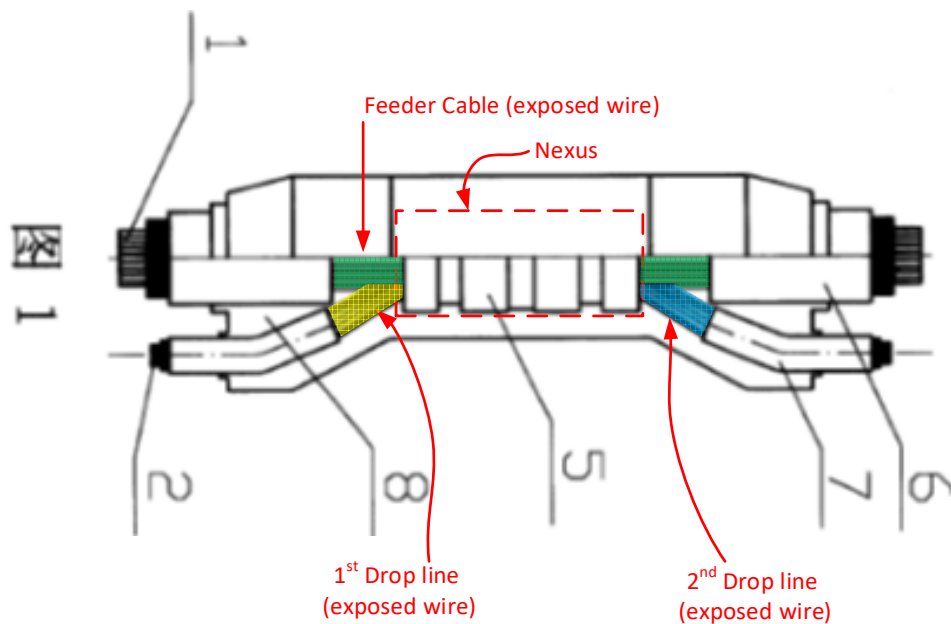
A POSITA considering Amphenol and Shao, would be motivated to use the added overmold taught by Yamawaki to provide added protection against environmental elements (e.g., waterproofing); *Decl.* ¶[243].

Thus, claim element 1(d) is obvious based on the Amphenol-Shao-Yamawaki combination.

Therefore, claim 1 is obvious based on the Amphenol-Shao-Yamawaki combination.

2. Claim 2

Shao discloses that the drop line (i.e., branch-line conductor 2) includes a section of exposed wire (yellow below) at the nexus. EX1008, FIG.1; *Decl.* ¶[245].

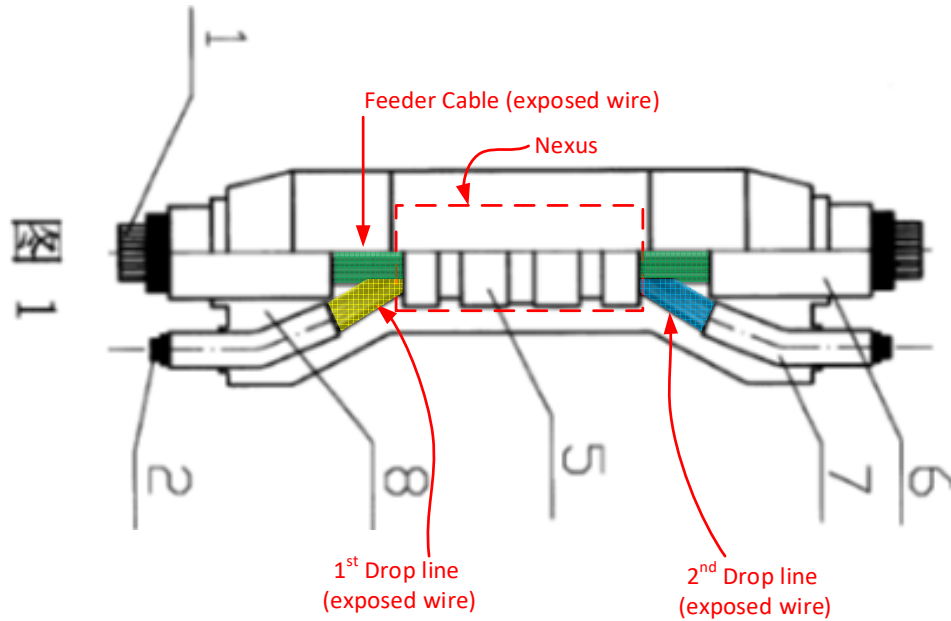


EX1008, FIG. 1 (1st-annotation)

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

3. Claim 3

Shao discloses that the feeder cable (trunk conductor 1) includes a section of exposed wire (green below) at the nexus. EX1008, FIG.1; *Decl.* ¶[248].

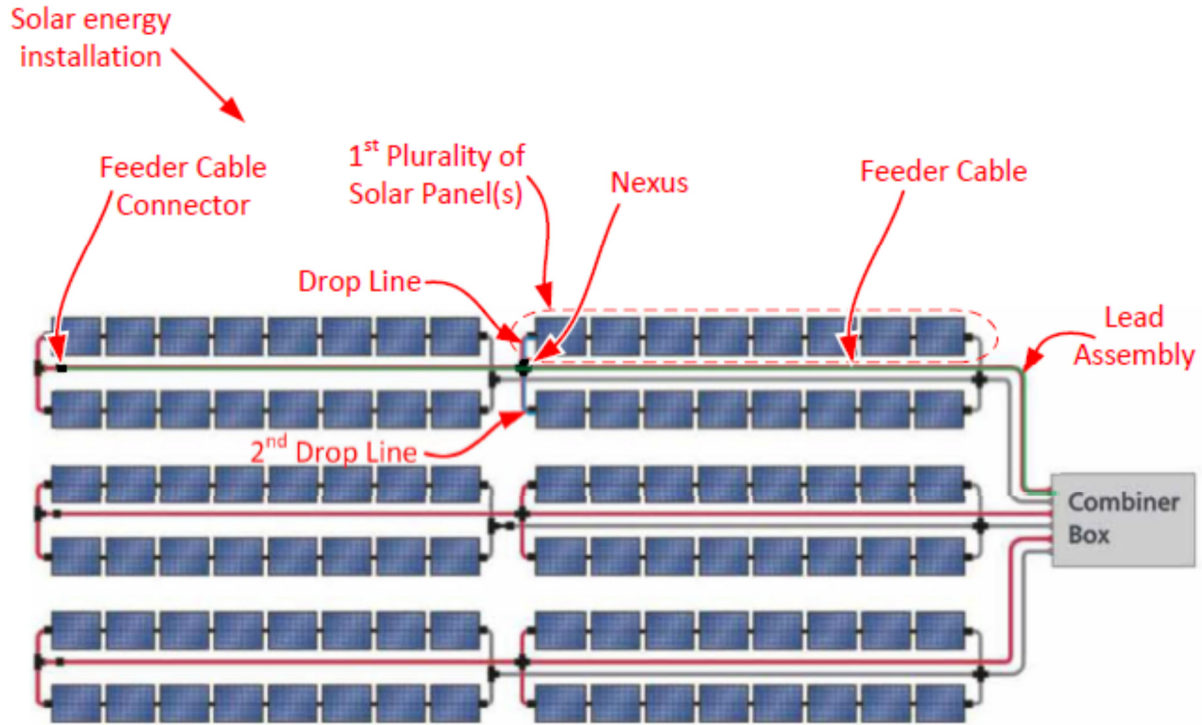


EX1008, FIG. 1 (1st-annotation)

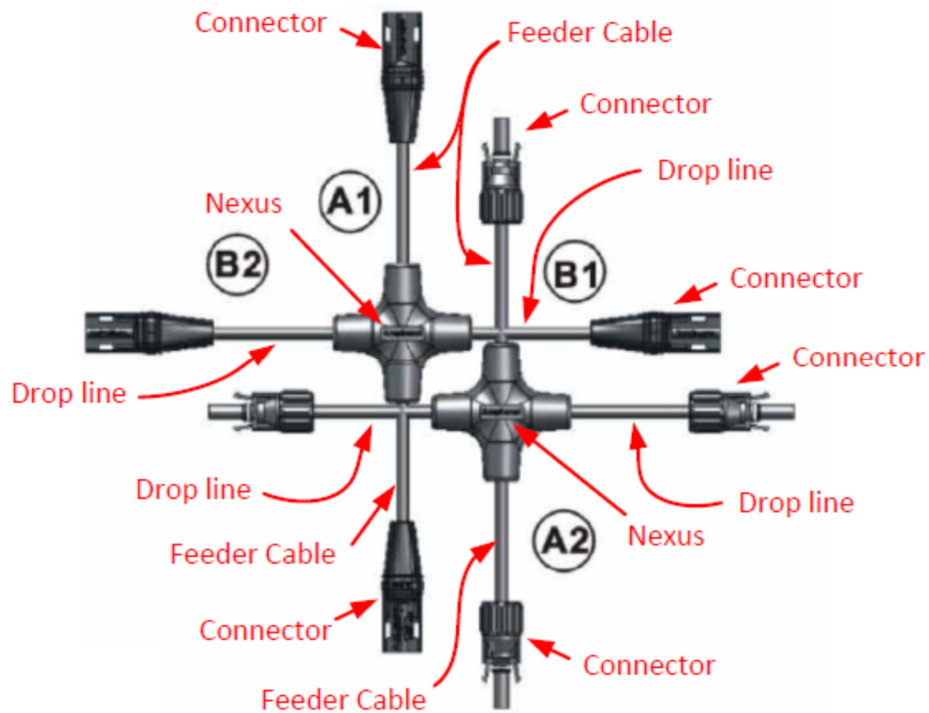
Thus, claim 3 is obvious based on the Amphenol-Shao-Yamawaki combination.

4. Claim 5

Amphenol discloses that the feeder cable terminates at a feeder cable connector. EX1007, pp.5,13; *Decl.* ¶[251].



EX1007, p.5, middle image (2nd-annotation)



EX1007, p.13, bottom image (1st-annotation)

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

5. Claim 6

Although Amphenol doesn't disclose the feeder cable connector attached directly to an inverter, this wiring configuration was well known to POSITAs. *Decl.* ¶[253] (citing EX1011 p.544). For example, a POSITA would have been familiar with the NEC 2002 which illustrates in Figure 690.1(B) of a main feeder cable of a branching "photovoltaic source circuit" connected directly to an inverter. *Id.*, see EX1010, Fig. 690.1(B), p.544.

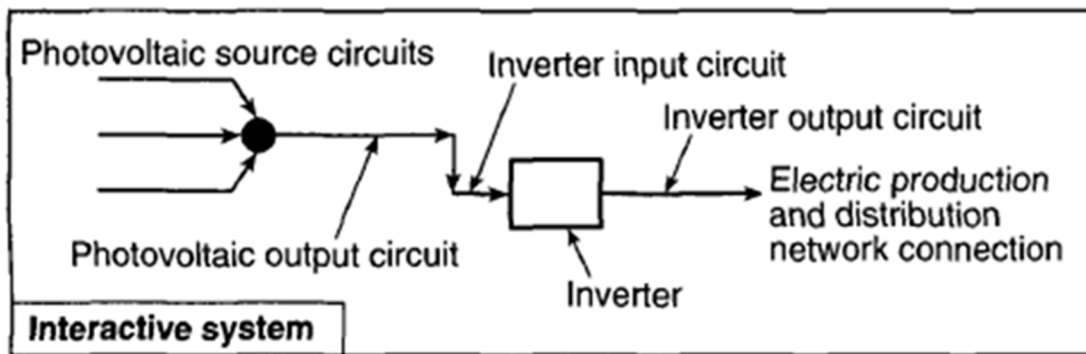


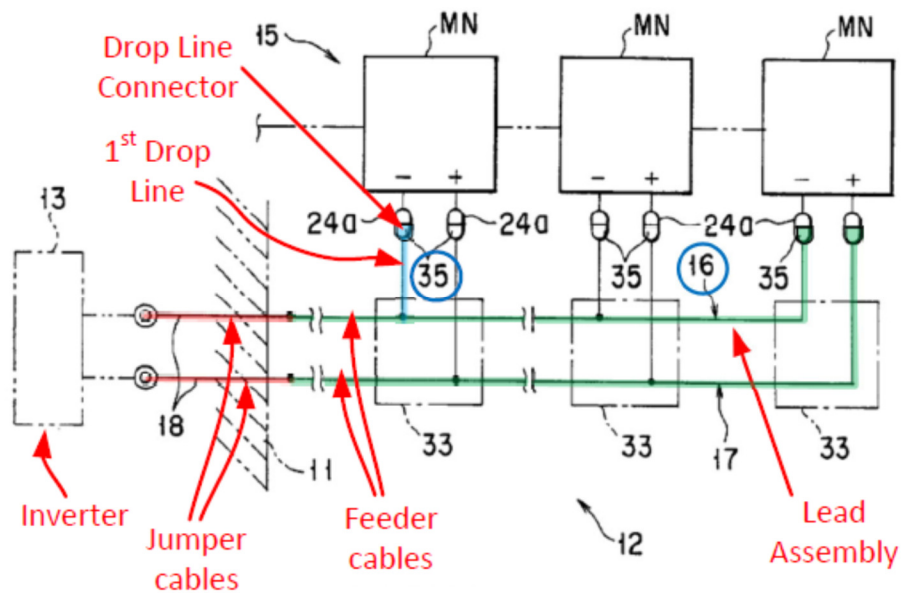
Figure 690.1(B) (top diagram)

Further, a POSITA would have been motivated to attach a feeder cable directly to an inverter, particularly for installations in which the inverter is in close proximity and can extend to be connected directly to feeder cable without the need for a jumper cable. *Decl.* ¶[256].

Thus, claim 6 is obvious based on the Amphenol and design choice of a POSITA. *Decl.* ¶[256].

6. Claim 7

Yamawaki FIG. 2 (below) discloses attaching a feeder cable (16, 17) directly to a jumper cable (18) that connects to an inverter (13). EX1006, 7:45-8:11. A POSITA would have been motivated to attach a feeder cable disclosed in Amphenol to a jumper cable that connects directly to an inverter as taught by Yamawaki to simplify installation, such as when routing cables through a structure as illustrated in FIG. 2. *Decl.* ¶¶[257],[258].



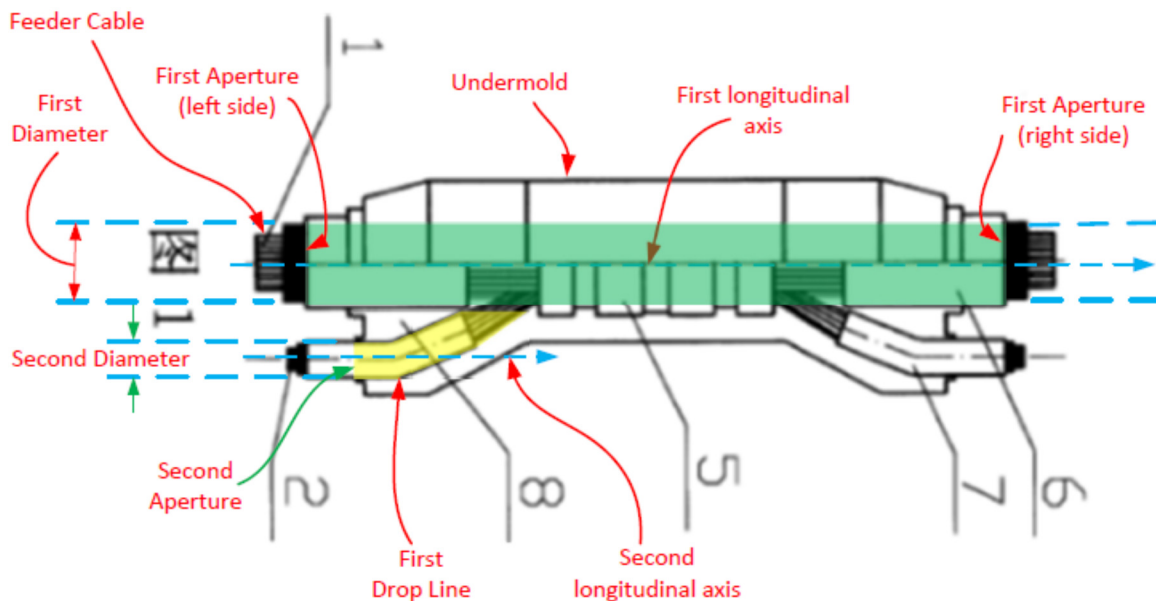
EX1006, FIG. 2 (1st-annotation)

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

7. Claim 8

Shao discloses that the first longitudinal axis (of the first aperture) and the second longitudinal axis (of the second aperture) are substantially parallel.

EX1008; *Decl.* ¶[260]. A POSITA would have been motivated to include the connection joint of Shao in a wiring assembly according to Amphenol and Yamawaki because the substantially parallel axis provides a compact configuration enabling two branch wires to divide off from the feeder cable, while maintaining a profile not much wider than the original feeder cable. *See id.* *Decl.* ¶[228].

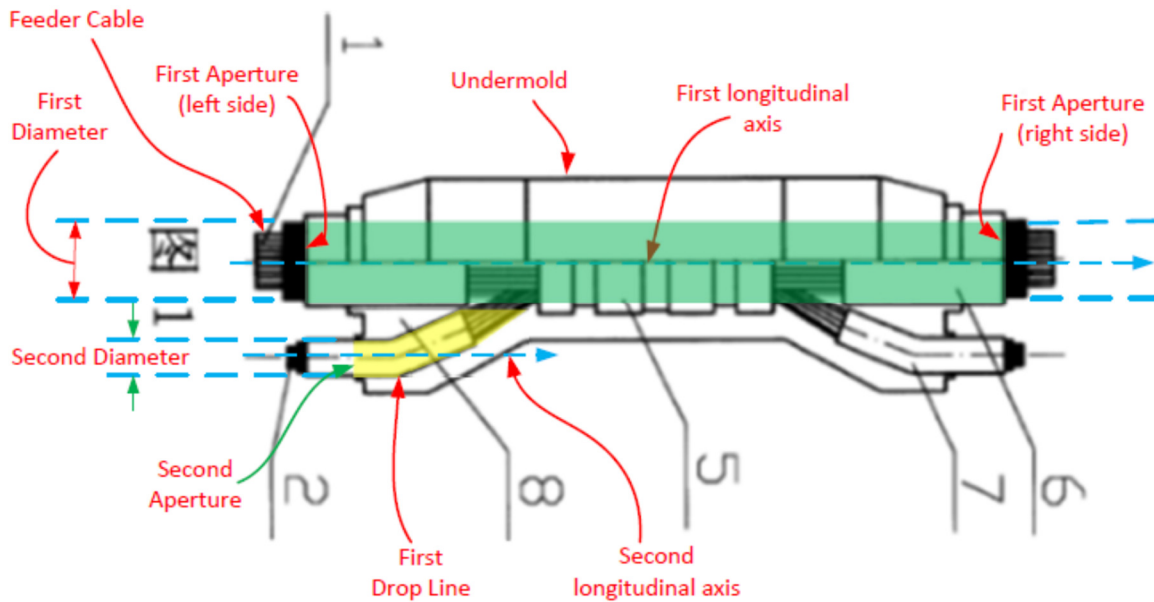


EX1008, FIG. 1 (3rd-annotation)

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

8. Claim 9

Shao discloses that the second diameter (of the second aperture) is smaller than the first diameter (of the first aperture). EX1008, FIG.1. *Decl.* ¶[262].



EX1008, FIG. 1 (3rd-annotation)

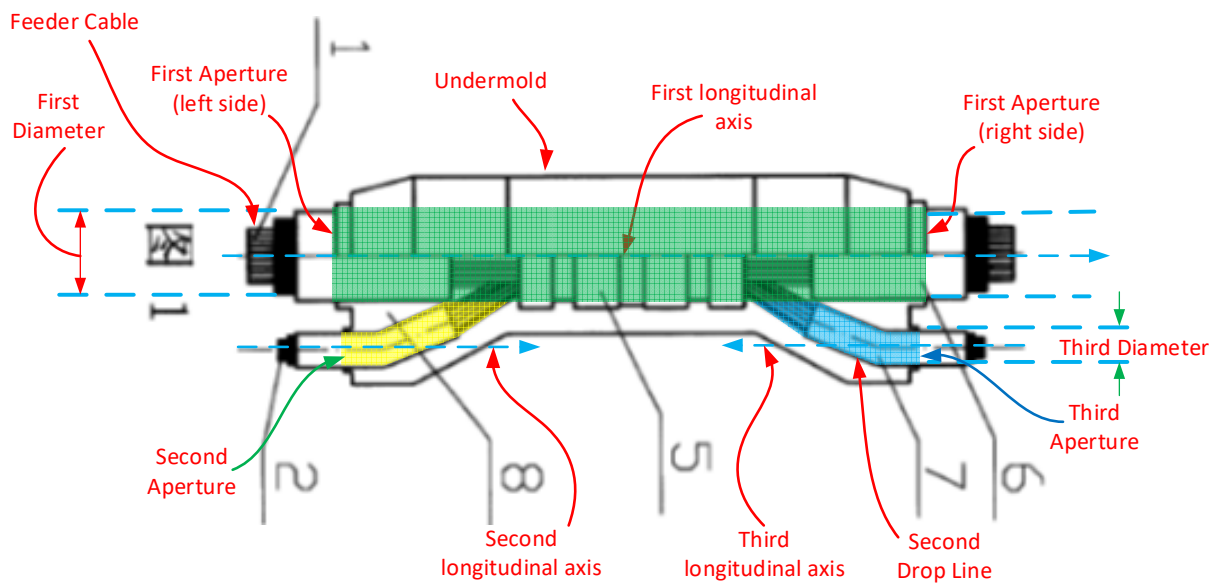
Further, a POSITA selecting cable sizes for solar installations would know from established electrical practices to use larger cables for feeder lines that carry more current than drop lines. *Decl.* ¶[263] (citing NEC2002, EX1010).

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

9. Claim 10

Shao discloses that the third longitudinal axis is substantially concentric with the second longitudinal axis, and substantially parallel with the first longitudinal

axis. EX1008, FIG.1; *Decl.* ¶[265].



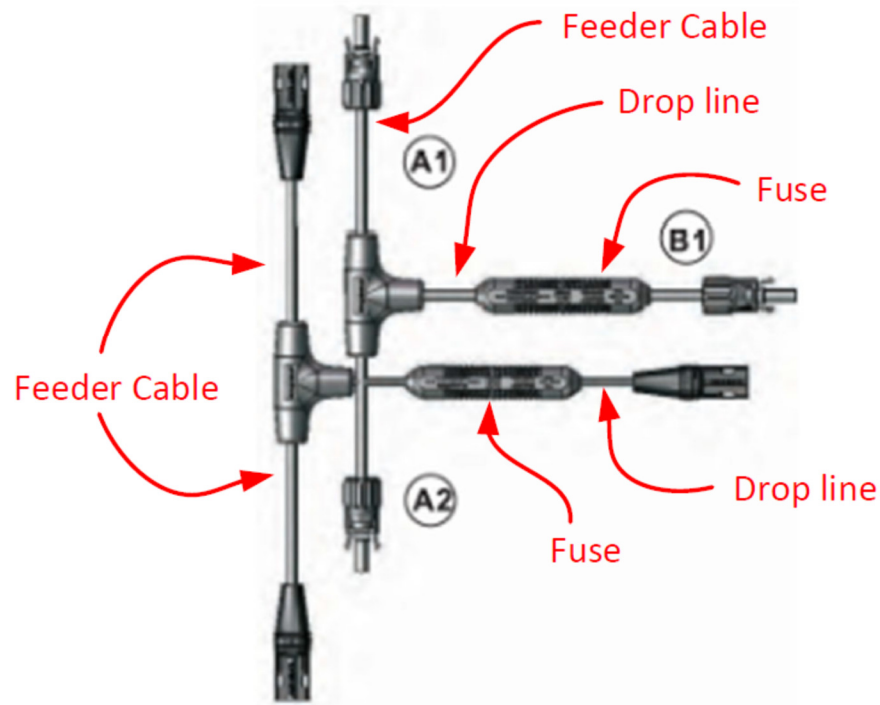
EX1008, FIG. 1 (5th-annotation)

A POSITA would be motivated to apply this concentric and parallel configuration taught by Shao to provide symmetry and a compact design. *Decl.* ¶[266].

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

10.Claim 11

Amphenol discloses that the drop line includes a fuse. EX1007, p.13; *Decl.* ¶[268].



EX1007, p.13, top image (1st-annotation)

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

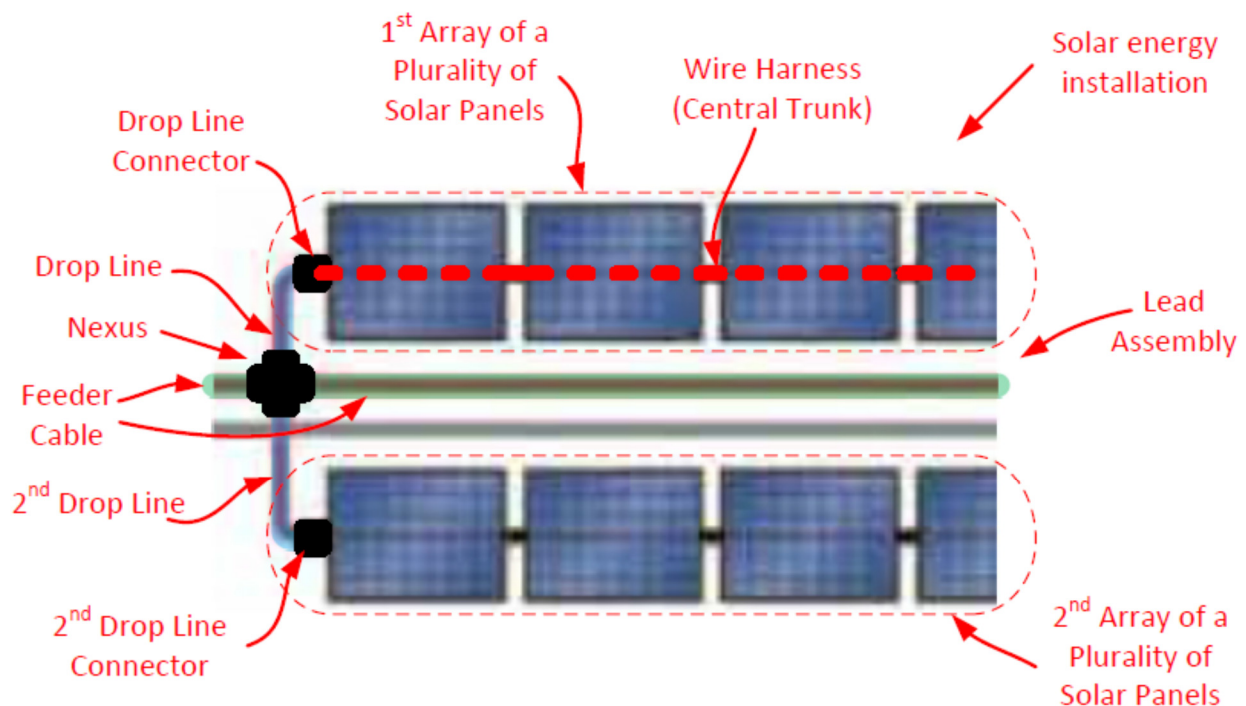
11.Claim 12

See Ground 2, claim elements 1(a) and 1(b), and claim 7. *Decl.* ¶[271].

12.Claim 13

Amphenol discloses that the second drop line terminates at a second drop line connector, the second drop line connector configured to connect with a central trunk of a second wire harness, the central trunk of the second wire harness having a plurality of branches that each are configured to electrically connect to a separate

solar panel contained in a second array of a plurality of solar panels. EX1007, p.5; *Decl.* ¶[272]. As discussed regarding the Ground 2, claim element 1(a), a POSITA would understand that the central trunk of Amphenol's wire harness has a plurality of branches that each electrically connects to separate solar panel modules that together are a part of an array of a plurality of solar panels. *See id.*



EX1007, p.5, middle image (Relief & 3rd-annotation)

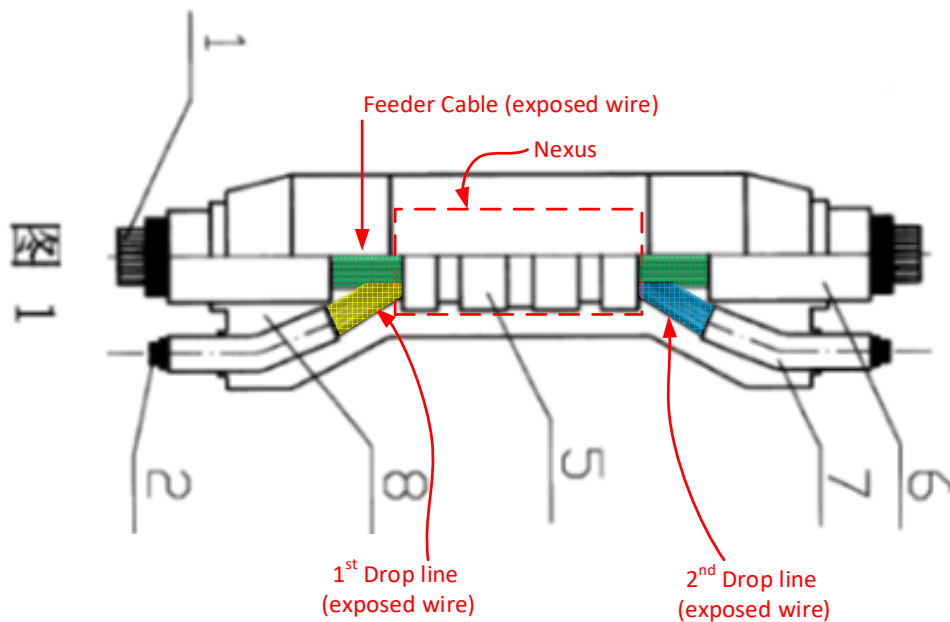
Thus, claim 13 is obvious based on the Amphenol-Shao-Yamawaki combination.

13.Claim 14

See Ground 2, claims 7, 12, and 13. *Decl.* ¶[276].

14.Claim 15

Shao discloses that the second drop line includes a section of exposed wire (colored blue) at the nexus so as to be electrically connected to the feeder cable (colored green). EX1008, FIG.1; *Decl.* ¶[277].



EX1008, FIG. 1 (1st-annotation)

Thus, claim 15 is obvious based on the Amphenol-Shao-Yamawaki combination. *Decl.* ¶[279].

15.Claim 16

Amphenol discloses that branch cable (i.e., drop line) gauge may be selected from 8AWG(10.0mm²), 10AWG(10.0mm²), 12AWG(10.0mm²), and

14AWG(10.0mm²), which a POSITA would understand to include a wire between four and eighteen gauge. EX1007, p.13(“Branch cable size checklist”); *Decl.* ¶[280].

Thus, claim 16 is obvious based on the Amphenol-Shao-Yamawaki combination.

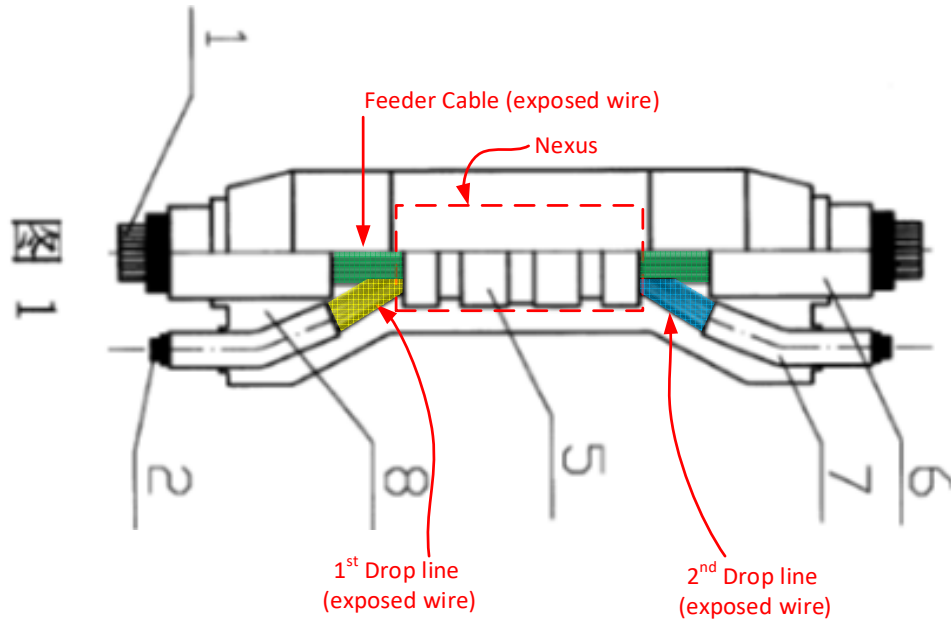
16.Claim 17

As discussed above regarding Ground 1, claim 17, a POSITA would understand that the selection of feeder cable size, in the range of 250 MCM to 1000 MCM is an obvious design choice in view of Amphenol.

Thus, claim 17 is obvious based on the Amphenol-Shao-Yamawaki combination.

17.Claim 18

Shao discloses that “an elongated copper C-shaped clamp is used to form a K-shaped branch connector 5,” which maintains an engagement between the feeder cable and the drops lines at the nexus. EX1008, p.6:17-18, FIG.1; *Decl.* ¶[285]. A POSITA would recognize that a C-shaped clamp used to form an electrical connector as disclosed in Shao is equivalent to a “crimp” and is beneficial for ensuring good conductivity. *Decl.* ¶[285].



EX1008, FIG. 1 (1st-annotation)

Thus, claim 18 is obvious based on the Amphenol-Shao-Yamawaki combination.

18.Claim 19

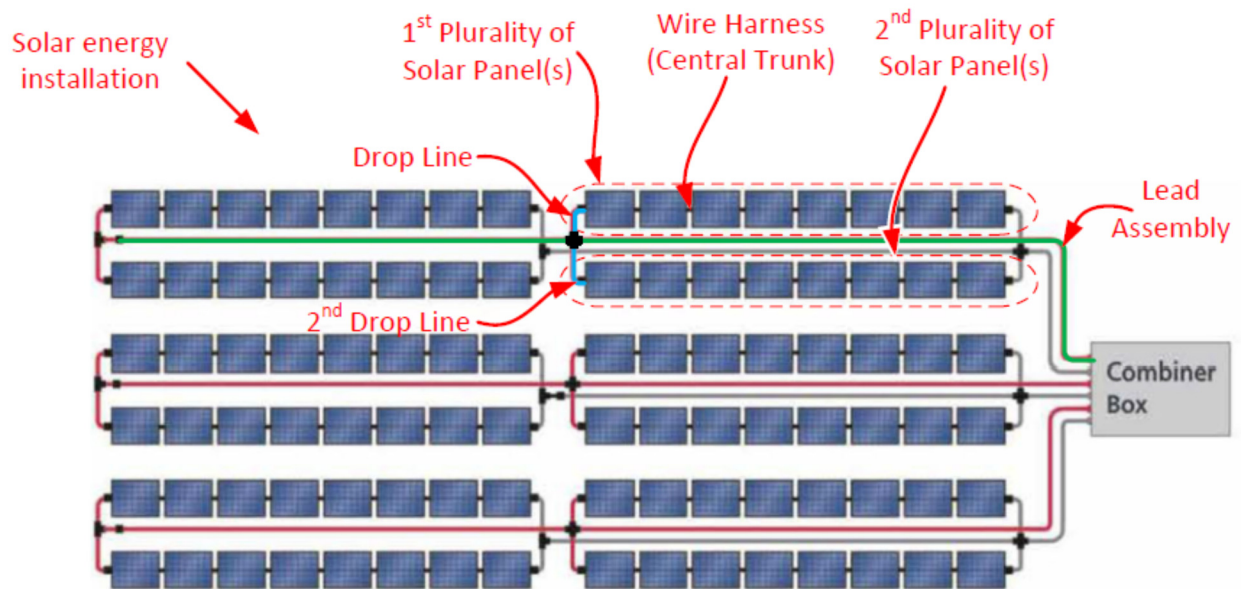
Shao discloses a feeder cable's electrical coupling to drop lines at a nexus that is covered by a sheath made of injection molding material. EX1008, p.5; *Decl.* ¶[288]. A POSITA would be motivated to apply the injection molded sheath (i.e., an undermold), as taught by Shao, to Amphenol to provide better protection from damage and/or exposure. *Decl.* ¶[288].

Thus, claim 19 is obvious based on the Amphenol-Shao-Yamawaki combination.

19.Claim 21

Preamble

See Ground 3, claim element 1(Preamble) and Amphenol discloses a solar energy installation (i.e., a solar power system). See EX1007, p. 5, middle image (1st-annotation), below. *Decl.* ¶[290].



EX1007, p. 5, middle image (1st-annotation)

Thus, the claim element 21(Preamble) is disclosed by Amphenol. *Decl.*

¶[291].

21(a)

See Ground 2, claim element 1(a). *Decl.* ¶[292]-[293].

21(b)

See Ground 2, claim element 1(Preamble). *Decl.* ¶[294].

21(b)(i)

See Ground 2, claim element 1(a). *Decl.* ¶[295].

21(b)(ii)

See Ground 2, claim element 1(c)(iii) and claim 13. *Decl.* ¶[296].

21(b)(iii)

See Ground 2, claim elements 1(b), 1(c)(iii) and claim 18. *Decl.* ¶[297]-
[298].

21(b)(iv)

See Ground 2, claim element 1(c) and claim 18. Note that “primary mold”
recited in claim 21 has the same meaning as “undermold” in claim 1. *See* IV. E.
Claim Construction. *Decl.* ¶[299]-[300].

21(b)(iv)(1)-21(b)(iv)(3)

See Ground 2, claim elements 1(c)(i), 1(c)(ii), and 1(c)(iii). *Decl.* ¶[301].

Therefore, claim 21 is obvious based on the Amphenol-Shao-Yamawaki
combination. *Id.*

20.Claim 22

See Ground 2, claims 6, 7, 12, and 14. *Decl.* ¶[302].

21.Claim 23

See Ground 2, claim element 1(d). *Decl.* ¶[303].

22.Claim 24

Preamble

See Ground 2, claim element 1(Preamble) and 21(Preamble). *Decl.* ¶[304].

24(a)

See Ground 2, claim element 1(a). *Decl.* ¶[305].

24(b)

See Ground 2, claim element 1(Preamble) and 21(Preamble). *Decl.* ¶[306].

24(b)(i)

See Ground 2, claim element 1(a). *Decl.* ¶[307].

24(b)(ii)

See Ground 2, claim element 1(b). *Decl.* ¶[308].

24(b)(iii)

See Ground 2, claim 1(c) and claim 18. Note that “primary mold” recited in claim 24 has the same meaning as “undermold” in claim 1. *See* IV. E. Claim Construction. *Decl.* ¶[309].

24(b)(iii)(1)

See Ground 2, claim 1(c)(i). *Decl.* ¶[310].

24(b)(iii)(2)

See Ground 2, claim 1(c)(ii). *Decl.* ¶[311].

24(b)(iv)

See Ground 2, claim 1(c)(iii). *Decl.* ¶[312].

Therefore, claim 24 is obvious based on the Amphenol-Shao-Yamawaki combination. *Id.*

C. Ground 3: Claim 20 is unpatentable under 35 U.S.C. § 103 as obvious in view of Amphenol, Shao, Yamawaki, and Tamura.

- **Motivation To Combine Amphenol, Shao, Yamawaki, and Tamura**

A POSITA would have been motivated to combine Amphenol, as modified by Shao and Yamawaki, with Tamura (i.e., the “Amphenol-Shao-Yamawaki-Tamura combination”) for the following reasons.

All four references involve cable assemblies that can be used to combine and distribute electrical power. As discussed above, the Amphenol-Shao-Yamawaki combination discloses a series of enhanced wiring assemblies combined in a solar power system with branch junctions that are compact and insulating for solar energy installations. *Decl.* ¶[314]. Tamura, like Shao, relates to the field of solar power cables and more specifically the molding of the branch junctions used for power distribution. EX1009, ¶[0003]. Amphenol, Shao, Yamawaki, and Tamura are analogous prior art to the ’153 Patent because they are directed to wiring assemblies like those claimed in the ’153 Patent. Therefore, a POSITA charged with designing or fabricating a solar power system and solving the problems

addressed in the '153 Patent, would be aware of and motivated to consider

Amphenol, Shao, Yamawaki, and Tamura. *Decl.* ¶¶[314,317].

A POSITA would have been motivated to enhance the wiring assembly taught by Amphenol, as modified by Shao and Yamawaki, to include greater protections of power cable joints with an outer mold as taught by Tamura for multiple reasons. First, Tamura discloses protecting power cable joints using an injection-molded outer mold over an inner mold. EX1009, ¶[0023]; *Decl.* ¶[322]. Second, Tamura teaches that better adhesion is achieved by an injection molded PVC outermold over a polyethylene (PE) undermold, which provides better waterproofing. EX1009, ¶[0009], above; *Decl.* ¶[319].

Amphenol, Shao, Yamawaki, and Tamura are not cumulative references because Amphenol focuses on cable assemblies, connectors, tools, and accessories, Shao addresses the details of the cable junctions, Yamawaki addresses the different and broader aspects of solar power installations, while including suggestions to use a double-molded structure, and Tamura teaches the further benefits of applying the overmolding using injection molding for high water proofing performance. *Id.* ¶[321].

A POSITA would have an expectation of success in making the Amphenol-Shao-Yamawaki-Tamura combination since these references complement one another by further protecting and strengthening solar power system branch

connections.

1. Claim 20

Tamura discloses applying an injection molded overmold over an undermold of a branch cable connection to provide an added layer of waterproofing. EX1009, ¶¶[0011],[0015]-[0017]. *Decl.* ¶[325]. In particular, 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, ¶[0014]; *Decl.* ¶[325]. A POSITA would have been motivated to add an injection molded overmold as taught by Tamura, over the injection-molded undermold taught by Shao, for added protection against environmental elements with improved adhesion between the molded layers. *Decl.* ¶[325].

Accordingly, claim 20 is obvious based on the Amphenol-Shao-Yamawaki-Tamura combination.

D. Ground 4: Claims 1-3, 5, 6, and 8-24 are unpatentable under 35 U.S.C. § 103 as obvious in view of Amphenol, Shao, and Tamura.

- **Motivation To Combine Amphenol, Shao, and Tamura**

A POSITA would have been motivated to combine Amphenol, Shao, and Tamura (i.e., the “Amphenol-Shao-Tamura combination”) for the following reasons.

Amphenol, Shao, and Tamura all disclose cable assemblies with branching

junctions. *Decl.* ¶[328]. As discussed in Ground 2, the Amphenol-Shao combination discloses an enhanced lead assembly with a compact robust protective insulating case to provide added protection for the elements and improved reliability suitable for use in a solar energy installation. *Decl.* ¶¶[197],[347]. Tamura, like Shao, relates to the field of solar power cables and more specifically the molding of the branch junctions used for power distribution. EX1009, ¶[0003]; *Decl.* ¶[328],[339]. Amphenol, Shao, and Tamura are analogous prior art to the '153 Patent because they are directed to wiring assemblies like those claimed in the '153 Patent. *Decl.* ¶¶[339]-[340]. Therefore, a POSITA charged with designing or fabricating a solar power system and solving the problems addressed in the '153 Patent, would be aware of and motivated to consider Amphenol, Shao, and Tamura. *Id.* ¶[339].

A POSITA would have been motivated to enhance the wiring assembly taught by Amphenol, as modified by Shao, to include greater protections of power cable joints with an outer mold as taught by Tamura for multiple reasons. First, Tamura discloses protecting power cable joints using an injection-molded outer mold over an inner mold. EX1009, ¶[0023]; *Decl.* ¶[350]. Second, Tamura teaches that better adhesion is achieved by an injection molded PVC outermold over a polyethylene (PE) undermold, which provides better waterproofing. EX1009, ¶[0009], above; *Decl.* ¶[350].

Amphenol, Shao, and Tamura are not cumulative references because

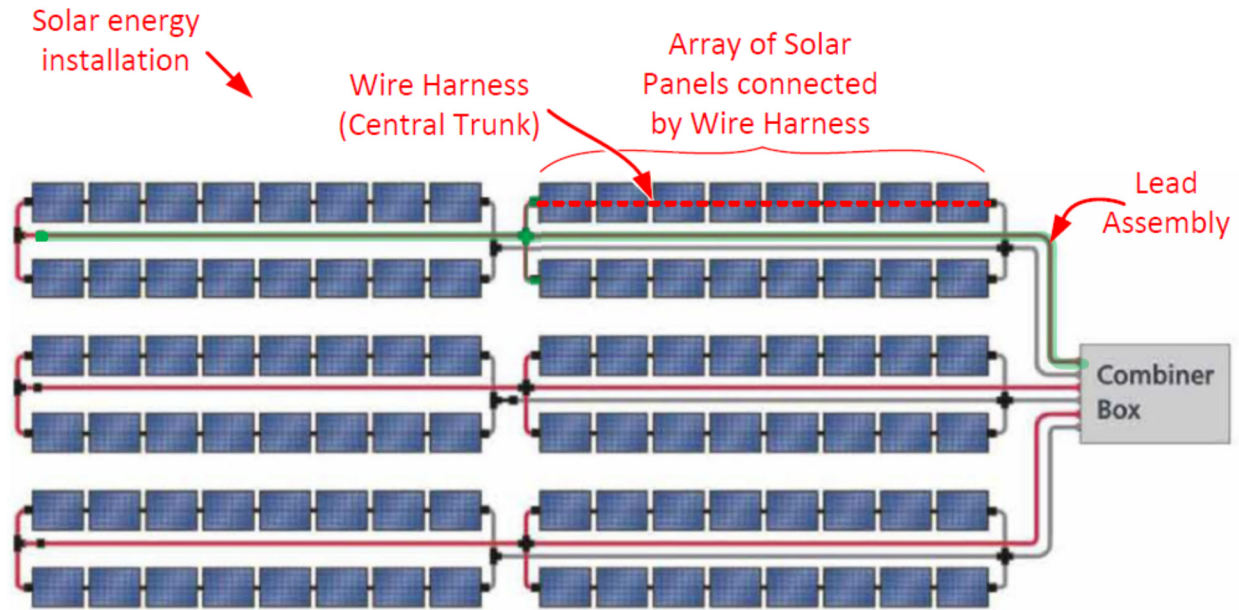
Amphenol focuses on cable assemblies, connectors, tools, and accessories, Shao addresses the details of the cable junctions, and Tamura teaches the further benefits of applying the overmolding using injection molding for high water proofing performance. *Id.* ¶¶[351],[353].

A POSITA would have an expectation of success in making the Amphenol-Shao-Tamura combination since these references complement one another by further protecting and strengthening solar power system branch connections. *Id.* ¶[352].

1. Claim 1

Preamble

As explained in Ground 2, claim element 1(Preamble), Amphenol discloses a **lead assembly** for solar energy installations. EX1007, p.5; *Decl.* ¶[357].



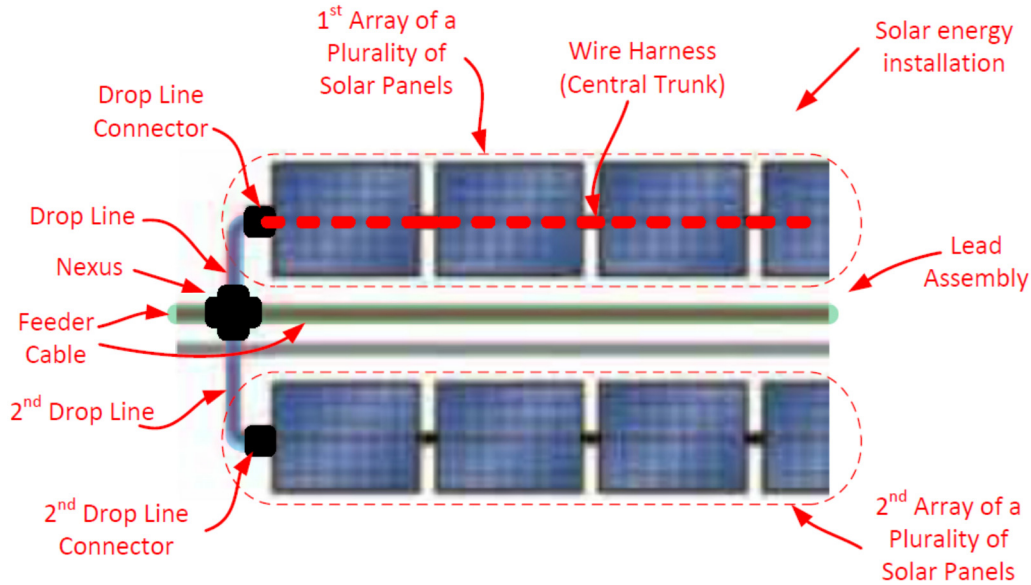
EX1007, p.5, middle image (1st-annotation)

Thus, claim element 1(Preamble) is obvious based on Amphenol. *Decl.*

¶[358].

1(a)

As discussed in Ground 2, claim element 1(a), Amphenol discloses two **drop lines** off a **feeder cable** of the lead assembly, where each drop line terminates in a drop line connector. EX1007, p.5(middle image); *Decl.* ¶[359]. A POSITA would understand that the central trunk (**red dotted line**) of Amphenol's wire harness inherently has a plurality of branches that each electrically connect to separate solar panel modules that together are a part of an array of a plurality of solar panels. *Decl.* ¶¶[212],[359]-[362].



EX1007, p.5, middle image (Relief & 2nd-annotation)

Thus, claim element 1(a) is obvious based on Amphenol and ordinary design choice of a POSITA. *Id.* ¶[363].

1(b)

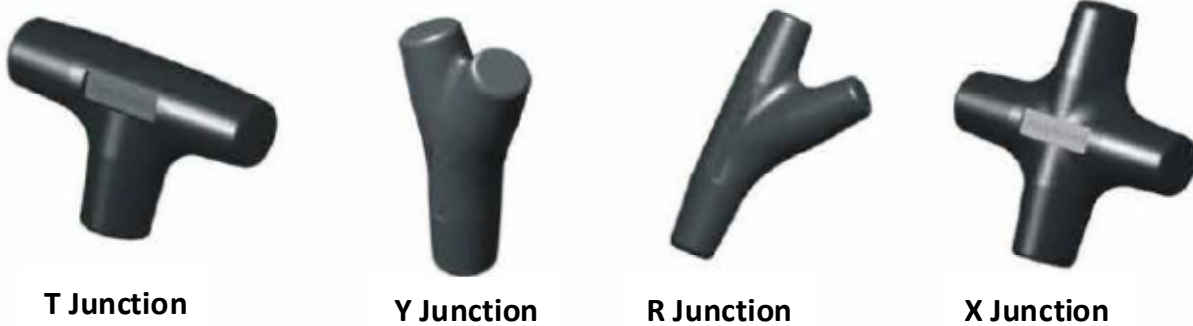
As discussed in Ground 2, claim element 1(b), Amphenol as modified by Shao discloses a feeder cable electrically coupled to the drop line at a nexus. *See* EX1007, p.13, 21; EX1008, FIG.1. *Decl.* ¶¶[364]-[365].

Thus, element 1(b) is obvious based on Amphenol and Shao. *Decl.* ¶[367].

1(c)

As discussed regarding Ground 2, claim element 1 (c), Amphenol discloses an undermold that fully encases the nexus as shown below. *See* EX1007, p.5; *Decl.* ¶¶[368]-[369].

Cable Assy and Diversity Junctions



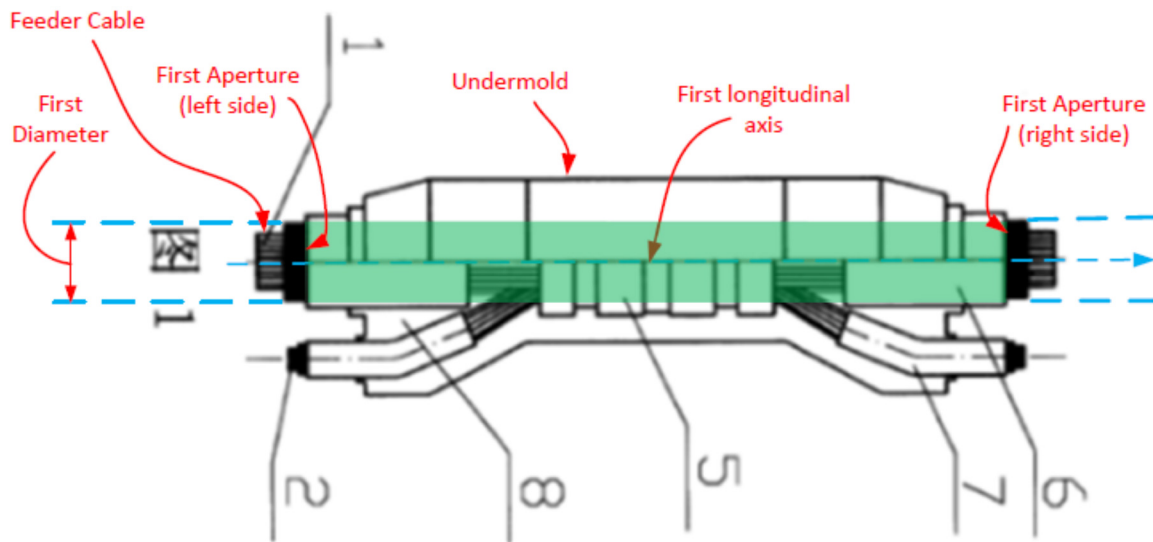
EX1007, p.5, bottom image

As discussed regarding Ground 2, claim element 1(c), Shao discloses a feeder cable electrically coupling to drop lines at a nexus, which a POSITA would be motivated to apply to Amphenol. EX1008, 5:16-20; *Decl.* ¶[370].

Thus, claim element 1(c) is obvious based on Amphenol and Shao. *Decl.* ¶[371].

1(c)(i)

As discussed in Ground 2, claim element 1(c)(i), Shao discloses a first aperture extending completely through the undermold and having a first diameter, wherein the feeder cable extends through the first aperture along a first longitudinal axis. *See* EX1008, FIG. 1; *Decl.* ¶[373]. A POSITA would be motivated to include junction connections from Shao within wiring assemblies using Amphenol cables and wiring harnesses in locations requiring more robust connections of drop lines to provide greater protection from moisture penetration and disassembly for tension loads on the cables. *Decl.* ¶[372].

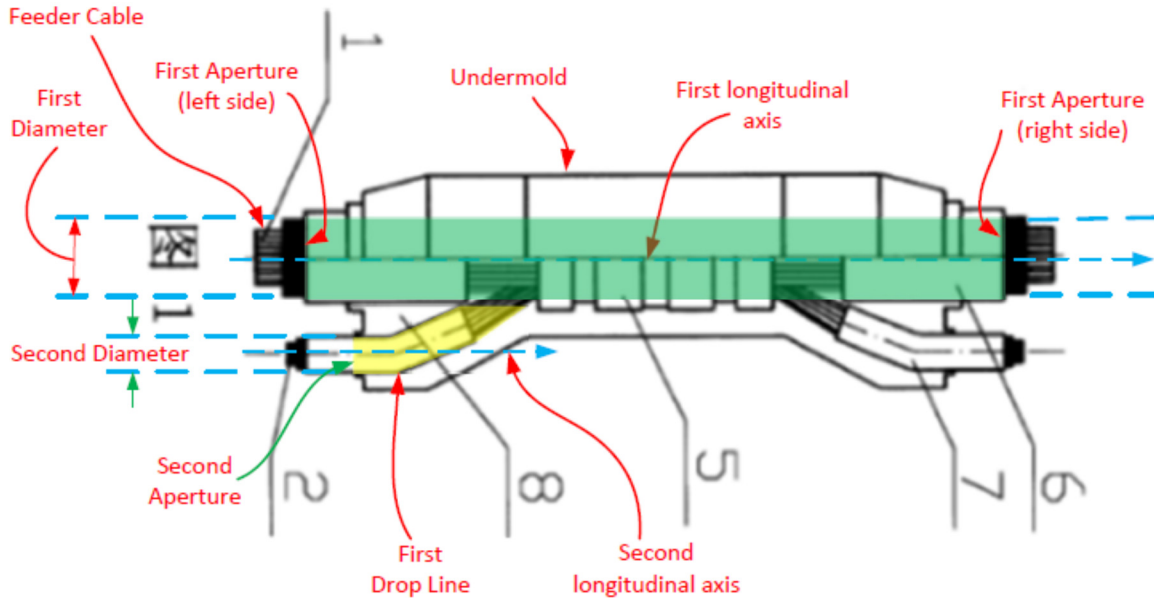


EX1008, FIG. 1 (2nd-annotation)

Is, element 1(c)(i) is obvious based on Amphenol and Shao *Decl.* ¶[374].

1(c)(ii)

As discussed in Ground 2, claim element 1(c)(ii), Shao discloses a second aperture extending partially through the undermold and having a second diameter different than the first diameter, wherein the drop line extends from the second aperture along a second longitudinal axis. *See* EX1008, FIG. 1 (3rd-annotation); *Decl.* ¶[375].

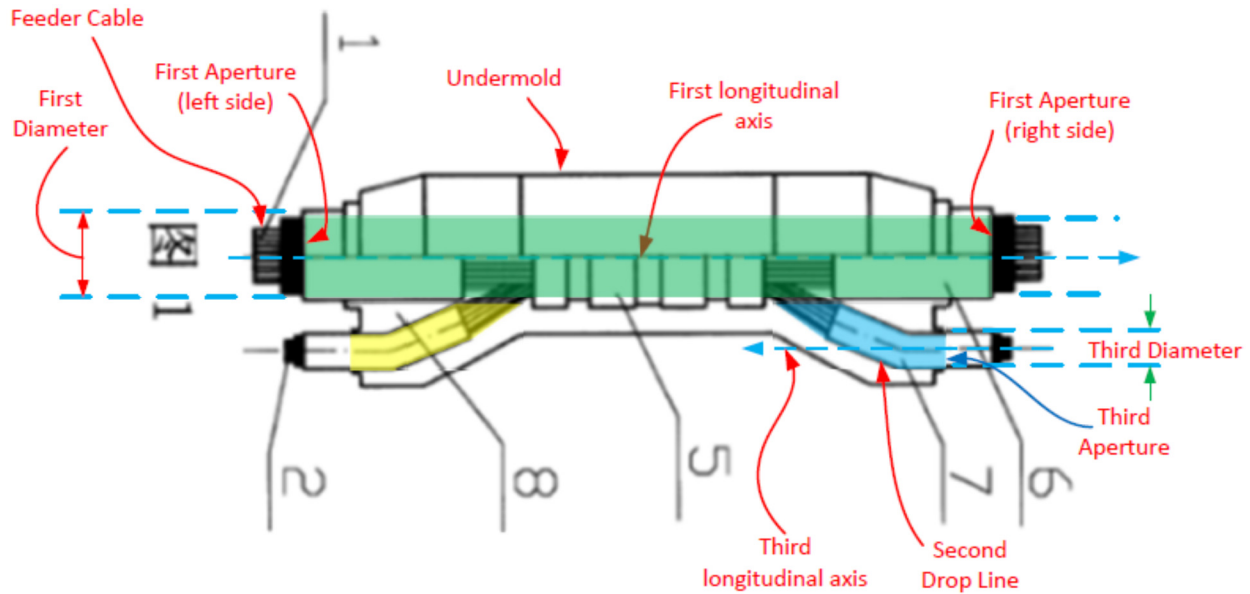


EX1008, FIG. 1 (3rd-annotation)

Thus, claim element 1(c)(ii) is obvious based on Amphenol and Shao. *Decl.* ¶[376].

1(c)(iii)

As discussed in Ground 2, claim element 1(c)(iii), Shao discloses a third aperture extending partially through the undermold and having a third diameter different than the first diameter, wherein a second drop line extends from the third aperture along a third longitudinal axis. EX1008, FIG.1; *Decl.* ¶[378].



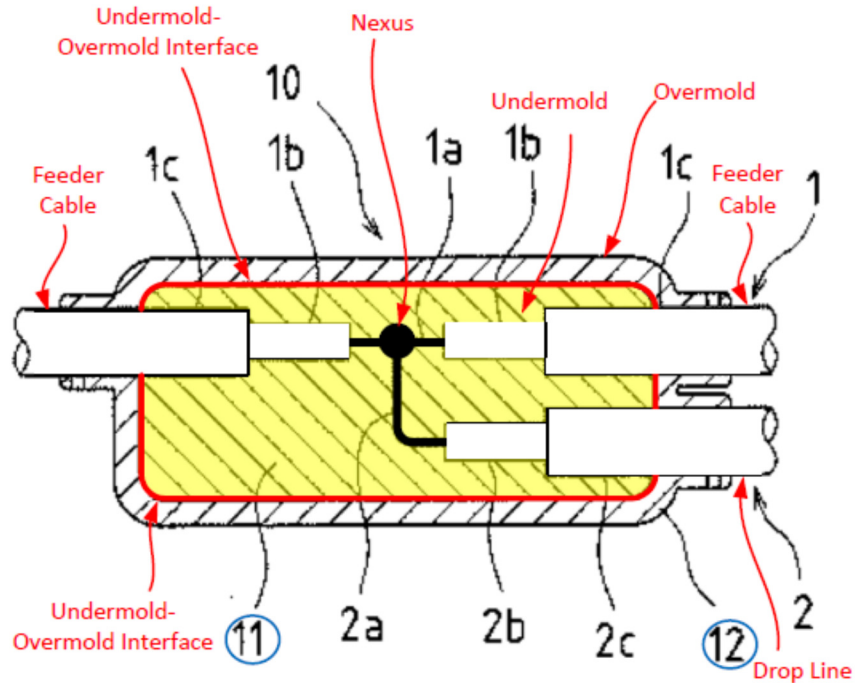
EX1008, FIG. 1 (4th-annotation)

Thus, element 1(c)(iii) is obvious based on Amphenol and Shao. *Decl.*

¶[380].

1(d)

Tamura FIG. 1 teaches applying an overmold over an undermold of a branch cable connection to provide an added layer of waterproofing. *Decl.* ¶[381]. A POSITA would have been motivated to modify the nexus designs of Amphenol and/or Shao to add an overmold according to Tamura in order to achieve greater waterproofing performance by virtue of a double waterproofing effect. *Id.*, ¶[382].



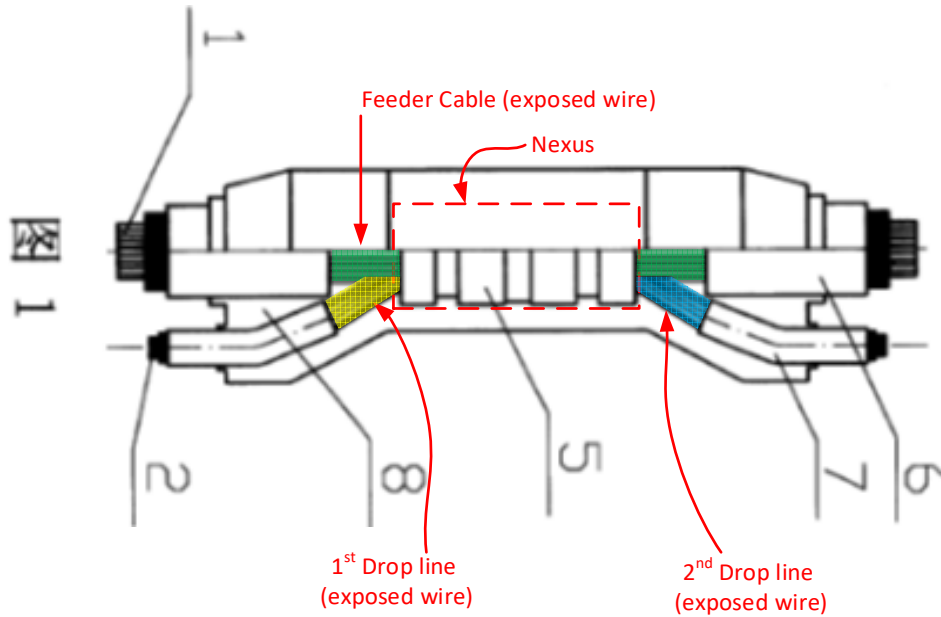
EX1009, Fig. 1 (1st-annotation)

Thus, element 1(d) is obvious based on the Amphenol-Shao-Tamura combination. *Decl.* ¶¶[382]-[388].

Therefore, claim 1 is obvious based on the Amphenol-Shao-Tamura combination.

2. Claim 2

Shao discloses that the drop line (i.e., branch-line conductor 2) includes a section of exposed wire (yellow below) at the nexus. EX1008, FIG.1; *Decl.* ¶[389].



EX1008, FIG. 1 (1st-annotation)

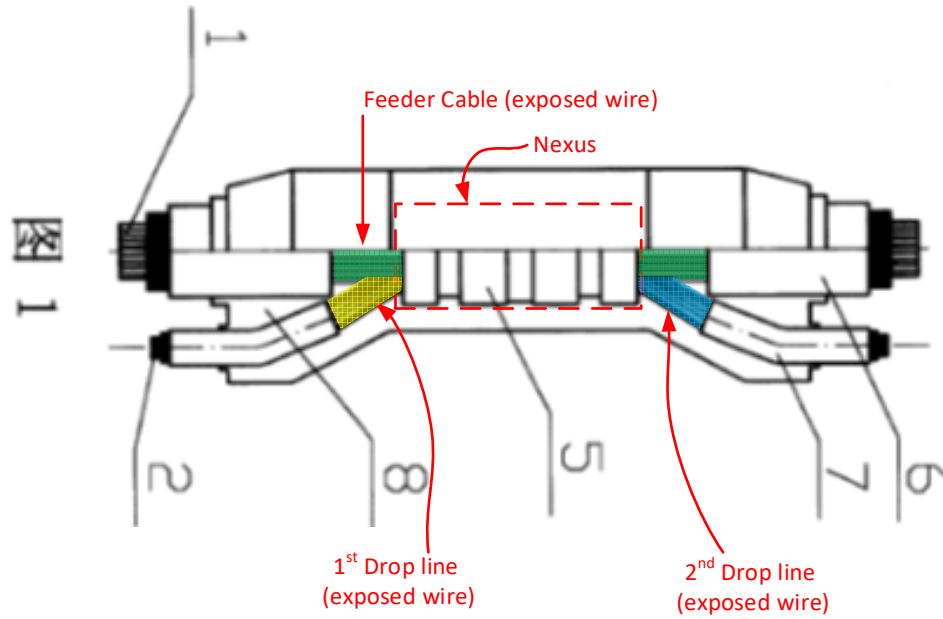
Thus, claim 2 is obvious based on the Amphenol-Shao-Tamura combination.

Decl. ¶[393].

3. Claim 3

Shao FIG. 1 discloses that the feeder cable (trunk conductor 1) includes a section of exposed wire (highlighted green) at the nexus. EX1008, FIG.1; *Decl.*

¶¶[394]-[395].



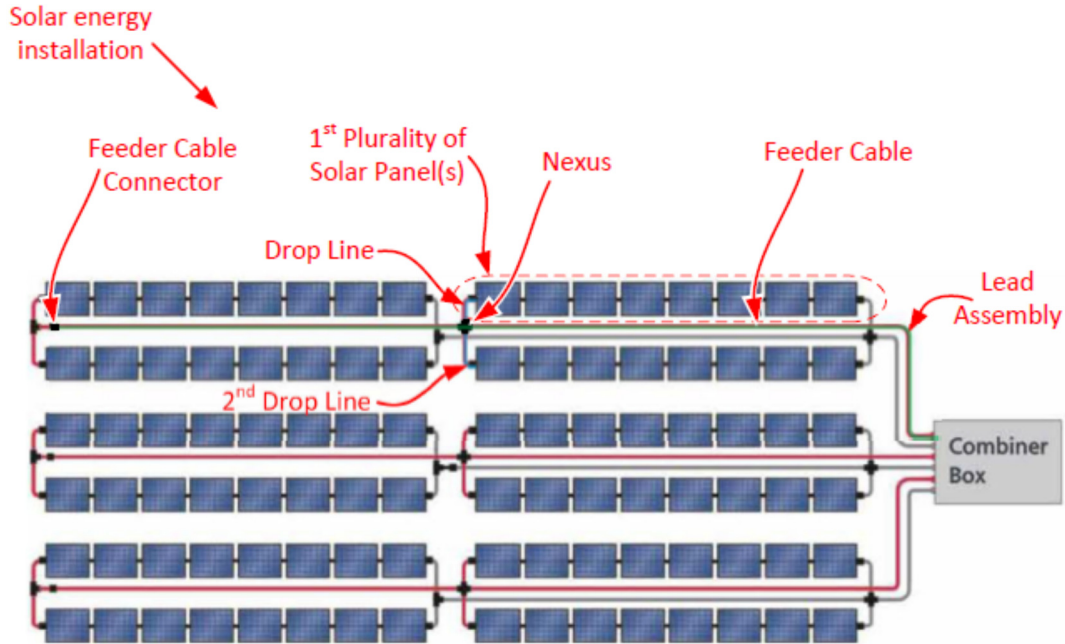
EX1008, FIG. 1 (1st-annotation)

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

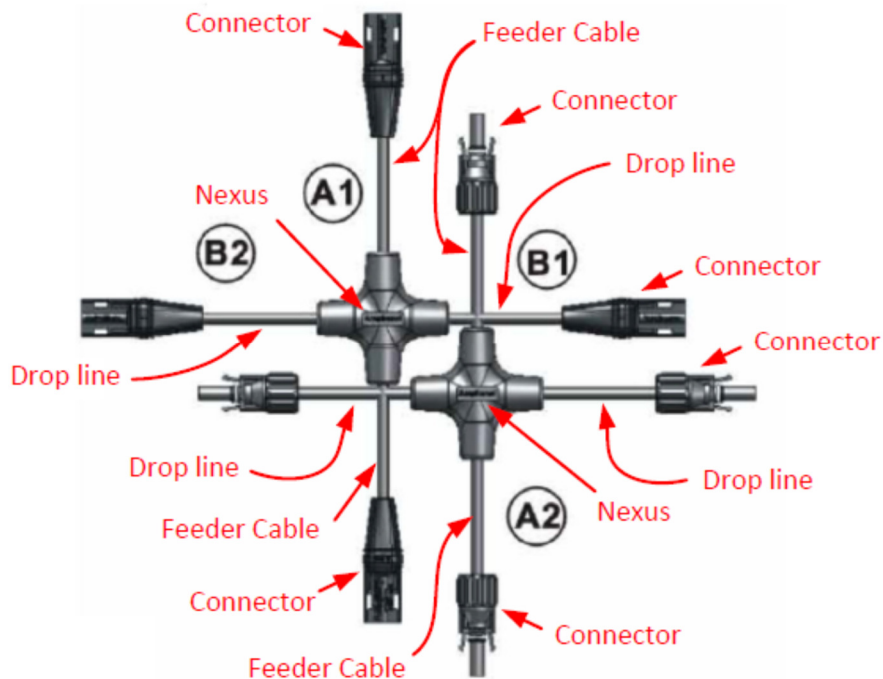
Decl. ¶[396].

4. Claim 5

Amphenol discloses that the feeder cable terminates at a feeder cable connector. EX1007, pp.5,13; *Decl.* ¶[397].



EX1007, p.5, middle image (2nd-annotation)



EX1007, p.13, bottom image (1st-annotation)

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

Decl. ¶[398].

5. Claim 6

Although Amphenol doesn't disclose the feeder cable connector attached directly to an inverter, this wiring configuration was well known to POSITAs.

Decl. ¶[399] (citing EX1010). For example, a POSITA would have been familiar with the NEC 2002 which illustrates in Figure 690.1(B) of a main feeder cable of a branching "photovoltaic source circuit" connected directly to an inverter. *Id.*, see EX1010, Fig. 690.1(B), p.544.

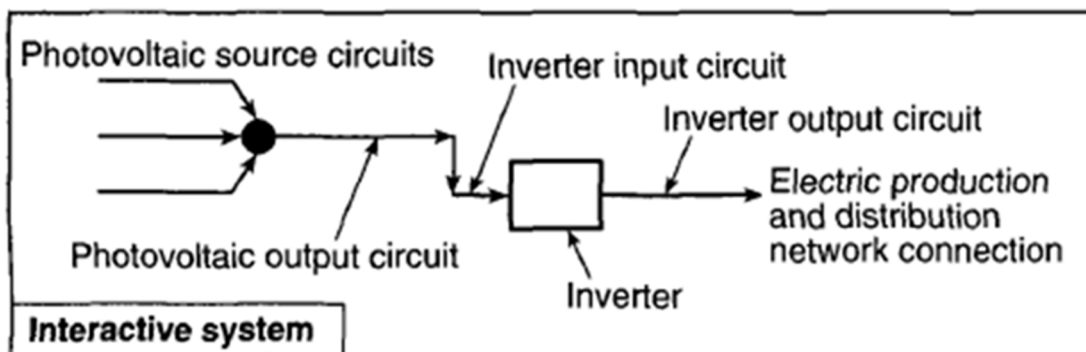


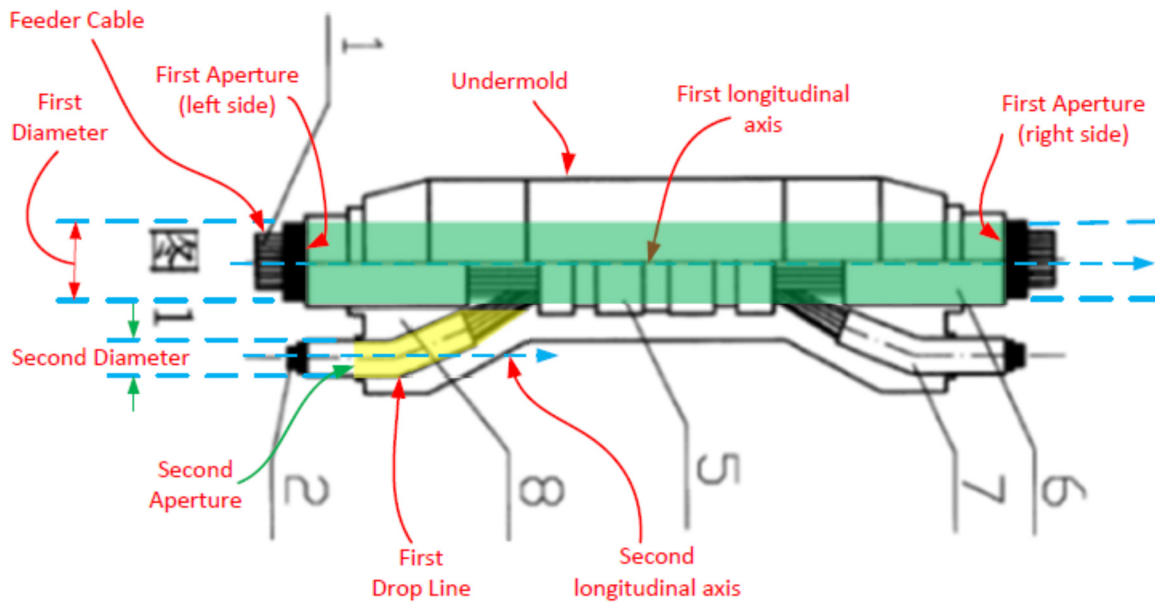
Figure 690.1(B) (top diagram)

Further, a POSITA would have been motivated to attach a feeder cable directly to an inverter, particularly for installations in which the inverter is in close proximity and can extend to be connected directly to feeder cable without the need for a jumper cable. *Decl.* ¶[400].

Thus, claim 6 is obvious based on the Amphenol-Shao-Yamawaki combination and obvious design choice of a POSITA. *Id.* ¶[402].

6. Claim 8

As discussed in Ground 2, Claim 8, Shao discloses that the first longitudinal axis (of the first aperture) and the second longitudinal axis (of the second aperture) are substantially parallel. EX1008; *Decl.* ¶[408].

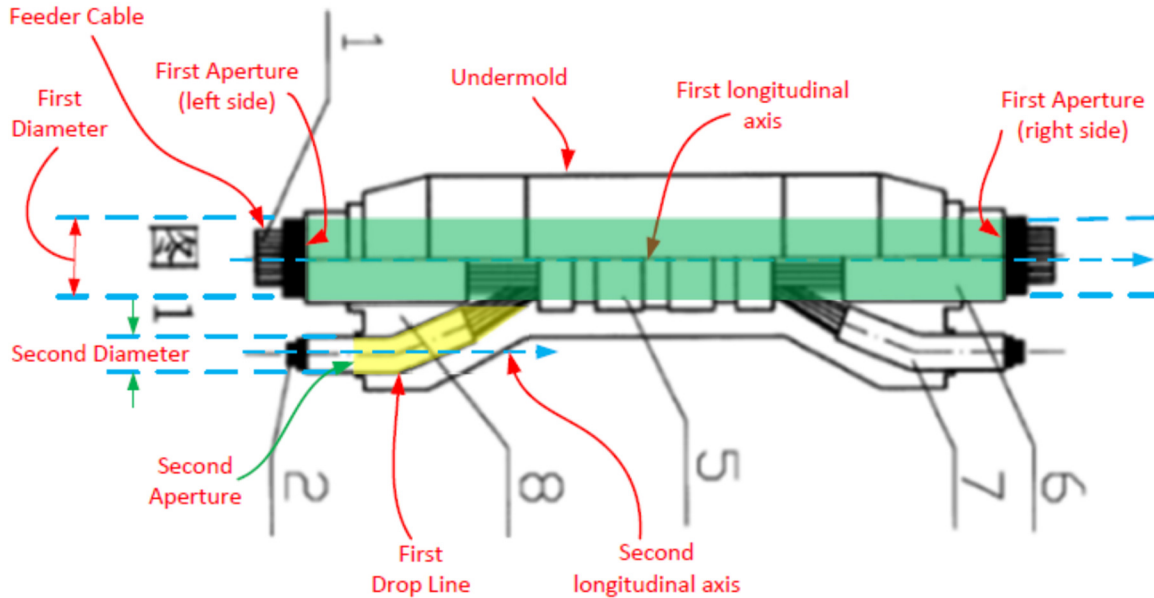


EX1008, FIG. 1 (3rd-annotation)

Thus, claim 8 is obvious based on the Amphenol-Shao-Tamura combination. *Decl.* ¶[404].

7. Claim 9

As discussed in Ground 2, Claim 9, Shao discloses that the second diameter (of the second aperture) is smaller than the first diameter (of the first aperture). EX1008, FIG.1. *Decl.* ¶[407].



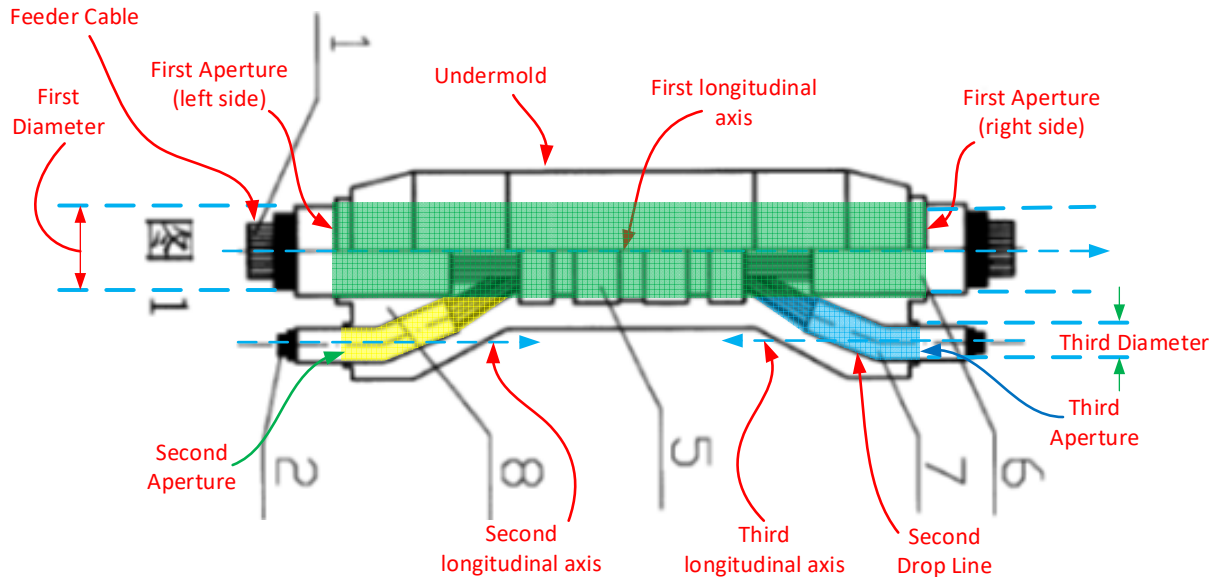
EX1008, FIG. 1 (3rd-annotation)

Further, a POSITA selecting cable sizes for solar installations would know from established electrical practices to use larger cables for feeder lines that carry more current than drop lines. *Decl.* ¶[408] (citing NEC2002, EX1010).

Thus, claim 9 is obvious based on the Amphenol-Shao-Tamura combination. *Decl.* ¶[409].

8. Claim 10

Shao FIG. 1 shows that a third longitudinal axis is substantially concentric with the second longitudinal axis, and substantially parallel with the first longitudinal axis. *Id.* ¶[410].



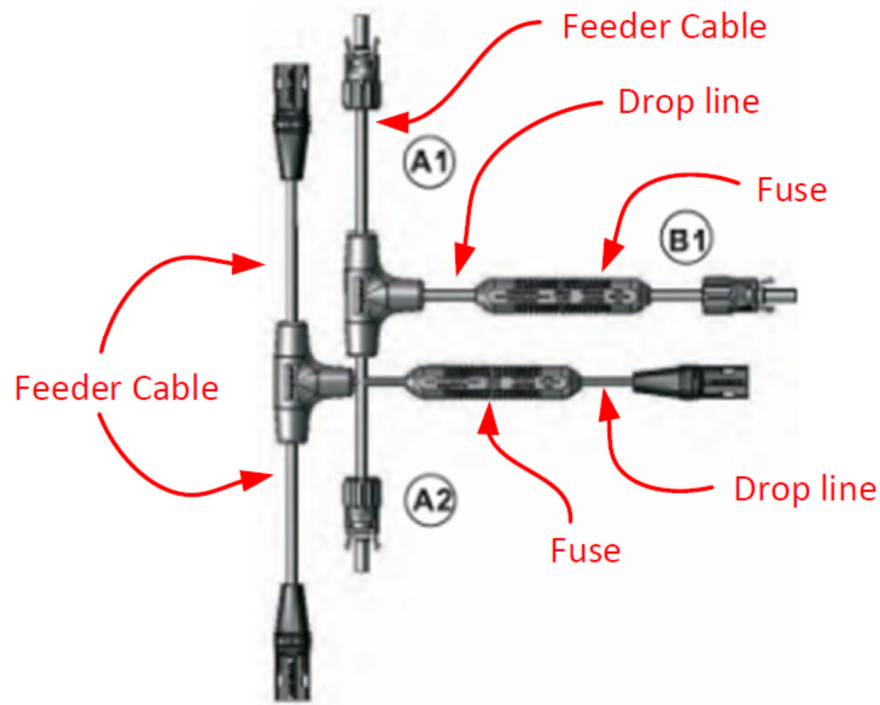
EX1008, FIG. 1 (5th-annotation)

A POSITA would have been motivated to apply this concentric and parallel configuration taught by Shao to provide symmetry and a compact design. *Decl.* ¶[411].

Thus, claim 10 is obvious based on the Amphenol-Shao-Tamura combination. *Id.* ¶[412].

9. Claim 11

Amphenol discloses that the drop lines include an inline fuse. EX1007, p.13; *Decl.* ¶[413].



EX1007, p.13, top image (1st-annotation)

Thus, claim 11 is obvious based on the Amphenol-Shao-Tamura combination. *Decl.* ¶[415].

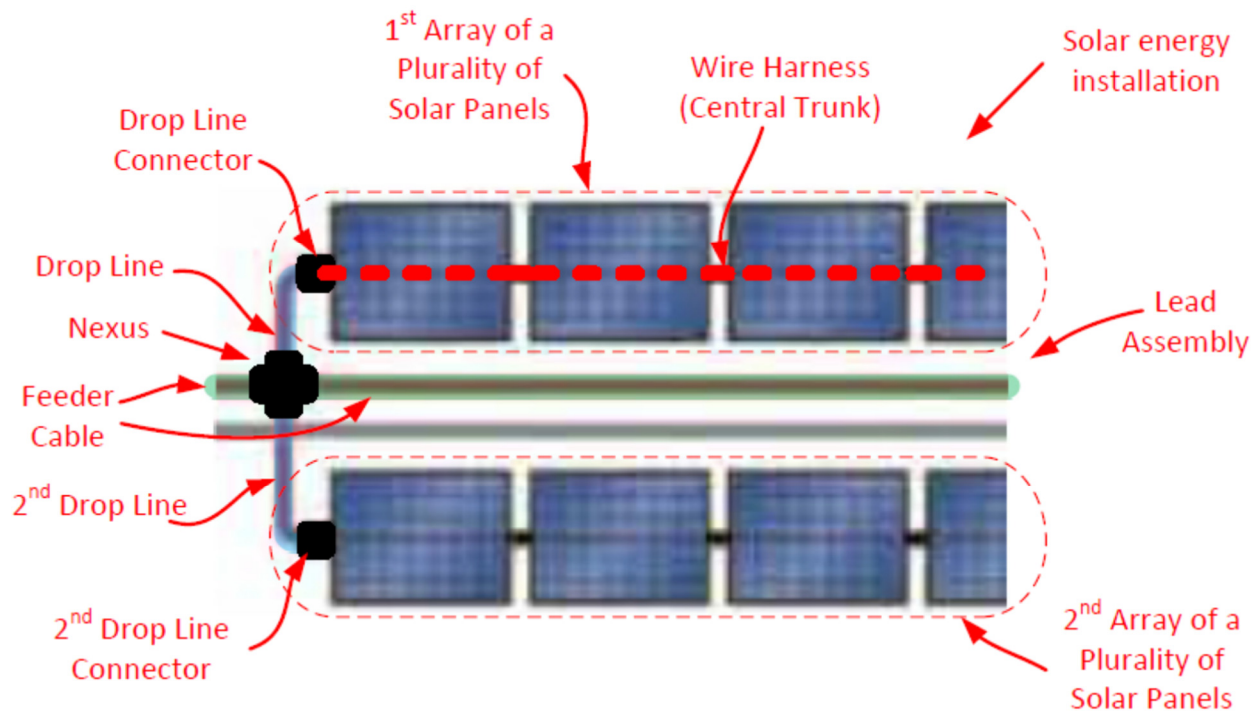
10.Claim 12

See Ground 2, claim elements 1(a) and 1(b), and claim 6. *See id.* ¶[416].

11.Claim 13

Amphenol offers for sale a flexible tool kit of solar power cables, junctions, connectors, fuses, etc. and provides guidance for designing/assembling various solar power system configurations. Using ordinary skill and knowledge (including knowledge from published wiring configurations examples), a POSITA would

have known to connect drop lines to a central trunk of a second wire harness that includes a plurality of branches electrically connected to separate solar panels if an installation includes a second (or more) array of solar panels. See EX1007, p. 5, middle image (Relief & 3rd-annotation); *Decl.* ¶[418].



EX1007, p. 5, middle image (Relief & 3rd-annotation)

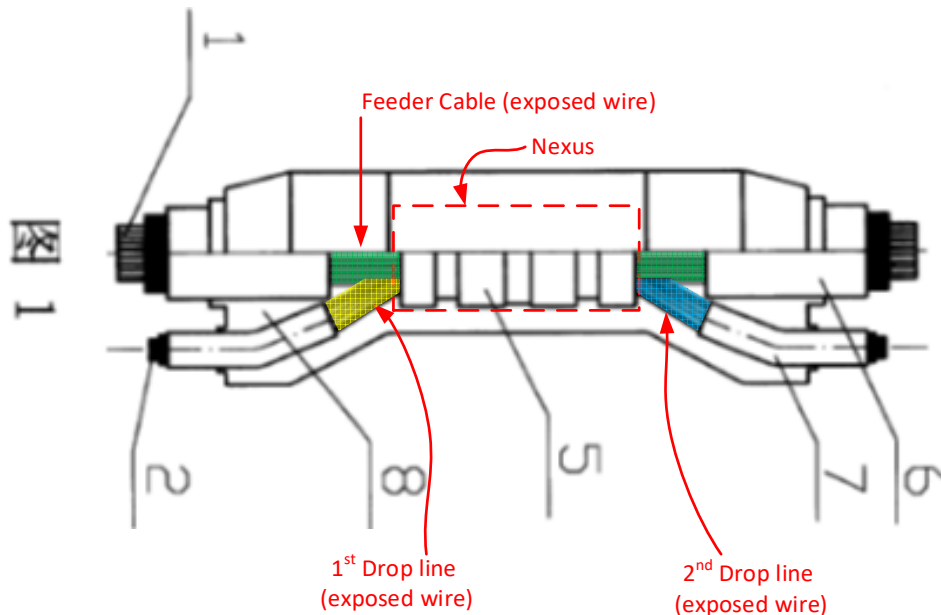
Thus, claim 13 is obvious based on the Amphenol-Shao-Tamura combination. *Decl.* ¶[420].

12.Claim 14

See Ground 4, claims 6, 12, and 13. *See id.* ¶[421].

13.Claim 15

Shao discloses that the second drop line includes a section of exposed wire (highlighted blue) at the nexus for electrically connecting to the feeder cable (highlighted green). EX1008, FIG.1; *Decl.* ¶[422].



EX1008, FIG. 1 (1st-annotation)

Thus, claim 15 is obvious based on the Amphenol-Shao-Tamura combination. *Decl.* ¶[424].

14.Claim 16

Amphenol discloses branch cables (i.e., drop line) of 8AWG(10.0mm²), 10AWG(10.0mm²), 12AWG(10.0mm²), and 14AWG(10.0mm²), which a POSITA would understand to include wires between four and eighteen gauge. *See* EX1007, p.13 (“Branch cable size checklist”); *Decl.* ¶[425].

Thus, claim 16 is obvious based on the Amphenol-Shao-Tamura combination. *Id.* ¶[426].

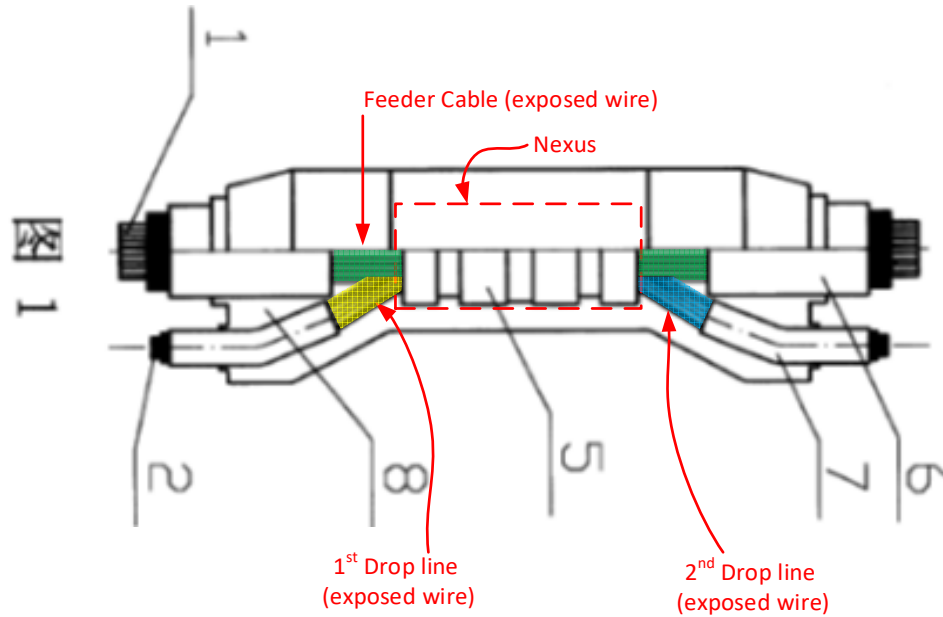
15.Claim 17

A POSITA would know to select feeder cable sizes in the range of 250 MCM to 1000 MCM based on currents anticipated in feeder cables in view of Amphenol and established electrical practices. *Decl.* ¶¶[427]-[428].

Thus, claim 17 is obvious as an obvious design choice based on the Amphenol-Shao-Tamura combination. *Id.* at ¶[429].

16.Claim 18

Shao discloses that “an elongated copper C-shaped clamp is used to form a K-shaped branch connector 5,” which maintains an engagement between the feeder cable and the drops lines at the nexus. EX1008, p.6:17-18, FIG.1; *Decl.* ¶[430]-[431]. A POSITA would recognize that the C-shaped clamp used to form an electrical connector in Shao is equivalent to a “crimp.” *Decl.* ¶[431].



EX1008, FIG. 1 (1st-annotation)

A POSITA would have been motivated to include the cabling joint of Shao in wiring assemblies based on Amphenol cables and components to provide a robust coupling based on the elongated C-shape clamp and the undermold to prevent moisture intrusion and disassembly due to cable tensions. *Decl.* ¶[343]-[347].

Thus, claim 18 is obvious based on the Amphenol-Shao-Tamura combination. *Id.* at ¶[432].

17.Claim 19

Shao discloses that the “K-shaped branch connector outer sheath 8 is made of an injection molding material.” EX1008, p.5; *Decl.* ¶[433]. When the overmold of Tamura is applied, the “outer sheath” of the Shao connector becomes an

“undermold.”

A POSITA would be motivated to use the connection joint designs in Shao and Tamura to provide more robust connection joints to provide greater strength and protections against environmental factors (e.g., moisture and wind). *Decl.* ¶¶[350],[434],[439]-[441].

Thus, claim 19 is obvious based on the Amphenol-Shao-Tamura combination. *Id.* ¶[435].

18.Claim 20

Tamura teaches using a PVC resin to form an overmold (i.e., outside molded portion 12) over an undermold (i.e., inside molded portion 11) of a drop line (i.e., branch cable) connection to provide an added layer of waterproofing with improved adhesion between the molded layers. *See* EX1009, ¶¶[0015]-[0017]; *Decl.* ¶[437]-[438]. As discussed, a POSITA would be motivated to apply an overmold according to Tamura to connection joints (nexus) of Amphenol and Shao to provide further protections against moisture intrusion. *Decl.* ¶¶[350],[434],[439]-[441].

Thus, claim 20 is obvious based on the Amphenol-Shao-Tamura combination. *Decl.* ¶[442].

19.Claim 21

Preamble

See Ground 2, claim 21(Preamble). *Decl.* ¶¶[350]-[444].

21(a)

See Ground 4, claim element 1(a). *Id.* ¶¶[445][446].

21(b)

See Ground 4, claim element 1(Preamble). *Id.* ¶[447].

21(b)(i)

See Ground 4, claim element 1(a). *Id.* ¶[448].

21(b)(ii)

See Ground 4, claim element 1(c)(iii) and claim 13. *Id.* ¶[449].

21(b)(iii)

See Ground 4, claim elements 1(b), 1(c)(iii) and claim 18. *Id.* ¶¶[450]-
[452].

21(b)(iv)

See Ground 4, claim element 1(c) and claim 18. *Id.* ¶¶[453]-[454]. Note that “primary mold” recited in claim 21 has the same meaning as “undermold” in claim 1. *See* IV. E. Claim Construction.

21(b)(iv)(1)-21(b)(iv)(3)

See Ground 4, claim elements 1(c)(i), 1(c)(ii), and 1(c)(iii). *Id.* ¶[455].

Therefore, claim 21 is obvious based on the Amphenol-Shao-Tamura combination.

20.Claim 22

See Ground 4, claims 6 and 7. *Id.* ¶[161]. *Decl.* ¶¶[456]-[457].

21.Claim 23

See Ground 4, claim element 1(d). *Id.* ¶[458].

22.Claim 24

Preamble

See Ground 4, claim element 1(Preamble) and 21(Preamble). *Id.* ¶[459].

24(a)

See Ground 4, claim element 1(a). *Id.* ¶[460].

24(b)

See Ground 4, claim element 1(Preamble) and 21(Preamble). *Id.* ¶[461].

24(b)(i)

See Ground 4, claim element 1(a). *Id.* ¶[462].

24(b)(ii)

See Ground 4, claim elements 1(b). *Id.* ¶[463].

24(b)(iii)

See Ground 4, claim element 1(c) and claim 18. *Id.* ¶[464]. Note that “primary mold” recited in claim 24 has the same meaning as “undermold” in claim 1. *See* IV. E. Claim Construction.

24(b)(iii)(1)

See Ground 4, claim element 1(c)(i). *Id.* ¶[465].

24(b)(iii)(2)

See Ground 4, claim element 1(c)(ii). *Id.* ¶[466].

24(b)(iv)

See Ground 4, claim element 1(c)(iii). *Id.* ¶[467].

Accordingly, claim 24 is obvious based on the Amphenol-Shao-Tamura combination.

E. Ground 5: Claims 1-3, 5-10, 12-15, 18, 19, and 21-24 are unpatentable under 35 U.S.C. § 103 as obvious in view of Yamawaki and Shao.

- **Motivation to Combine Yamawaki and Shao**

Yamawaki and Shao are both concerned with wire harnesses, cable junctions, connectors, and other components to be used for distributing electrical power. *Decl.* ¶[469]. Yamawaki discloses how photovoltaic modules can be arranged in various ways to overcome challenges and support the design of a photovoltaic panel array, such as on a home solar energy installation. EX1006, 7:54-8:11. Shao discloses a detailed design of a cable junction to be used for power distribution in a large-scale facility. EX1008, Abstract. Both references discuss the design of cable junction elements that can be used to combine or distribute electrical power including solving the same problems as the '153 Patent including providing reliable electrical connections between different cables,

protecting electrical connections from environmental factors and damage, and providing the structures in a way that reduces cost and simplifies the assembly and maintenance of the power facilities. *Decl.* ¶[469]. Yamawaki and Shao disclose designs of cable junction elements that can be used to combine or distribute electrical power and are, thus, in the same field of endeavor as the '153 Patent. *Id.* Therefore, both Yamawaki and Shao are analogous prior art to each other and to the '153 Patent. *Id.*

A POSITA would have been motivated to combine Yamawaki with Shao (the “Yamawaki-Shao combination”) because both references address the general problem of providing convenient, flexible, reliable, and low-cost wiring harnesses. EX1006, 2:64-65; *Decl.* ¶[470]. 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. Also, Shao teaches improvements to branch junctions that can provide, “[t]he 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.

In particular, the benefits of the undermold of Shao include “improved reliability”, prolonged “service life”, with “good sealing performance”; and the benefits of the cover member (overmold) of Yamawaki include “...it is so water

resistant that the reliability of the wiring apparatus 16 and 17 to resist penetration of water can be improved.” EX1008, 5:28-32; EX1006, 13:15-18. A POSITA would understand that the combination of the undermold of Shao and the overmold of Yamawaki would provide complimentary and additive benefits, and that the sum of the benefits of the individual molds would lead to an improved product. *Decl.* ¶¶[471],[474],[476]. Thus, a POSITA would have been motivated to modify Yamawaki to incorporate branch junctions with an undermold configuration of Shao to provide better sealing against moisture in a smaller profile for easier installation. *Id.*

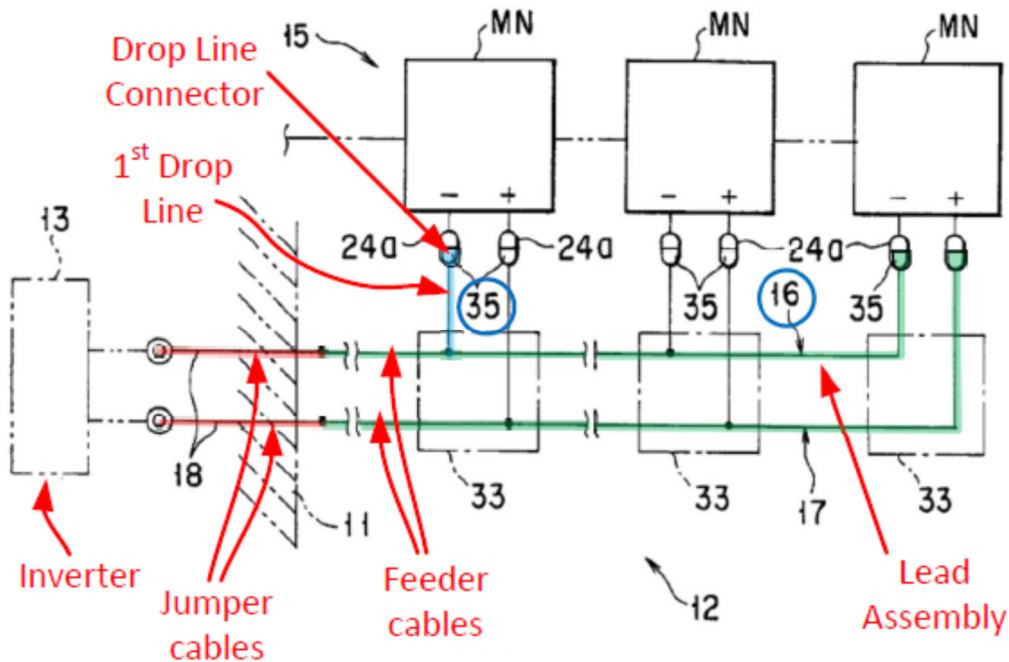
While Yamawaki is directed to solar power arrays applications and Shao is directed to power distribution in general, a POSITA would have understood that the underlying mechanics, materials, assembly processes, molding processes, and other details of electric power connectors that are compatible and familiar elements in the art. *Decl.* ¶¶[472]-[474]. Therefore, a POSITA would have an expectation of success in combining the teachings of Yamawaki and Shao because the components are versions of well-known wiring components designed for use in the field and do not involve unpredictable technology. *Decl.* ¶[475].

1. Claim 1

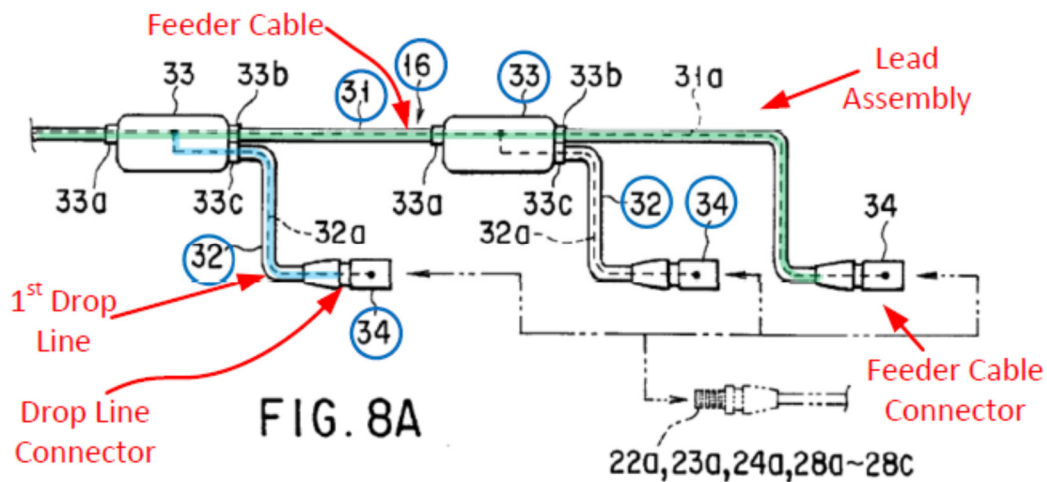
Preamble.

Yamawaki discloses a lead assembly (**wiring apparatus 16**) for use in a solar

energy installation. EX1006, 8:12-15,9:57-63,FIG.2,FIG.8A; Decl. ¶[477]-[478].



EX1006, FIG. 2 (1st-annotation)



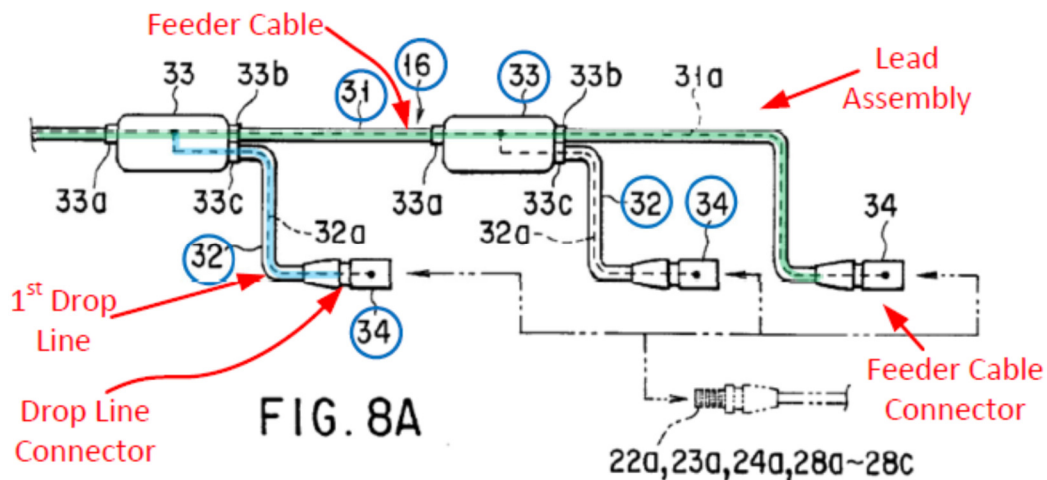
EX1006, FIG. 8A (1st-annotation)

Thus, Yamawaki discloses the preamble. Decl. ¶[478].

1(a)

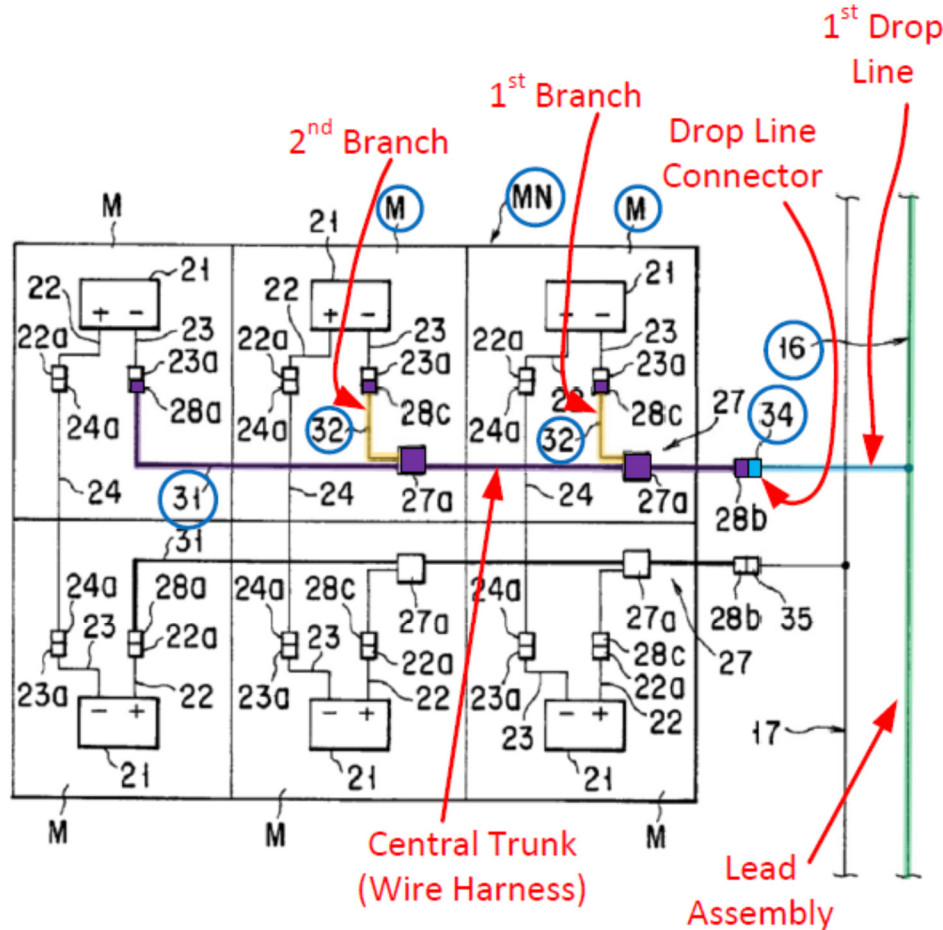
Yamawaki discloses that the lead assembly (e.g., wiring apparatus 16) is

formed by a feeder cable (trunk cable 31), one or more branch junctions (branch junction 33), and one or more drop lines (branch cable 32) that branch off the feeder cable of the lead assembly, where the drop lines each terminate in a drop line connector (connector 34). EX1006, 11:3-13, FIG. 8A; Decl. ¶[479].



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

Yamawaki discloses that the drop line connector (connector 34) is connected to a central trunk (trunk cable 31) of a wire harness (wiring apparatus 27) and the central trunk of the wire harness has a plurality of branches (branch cables 32) that each electrically connect to separate solar panels (modules M) that together are a part of module units MN, which form an array of a plurality of solar panels. EX1006, 8:43-57, FIG. 7; Decl. ¶[480].

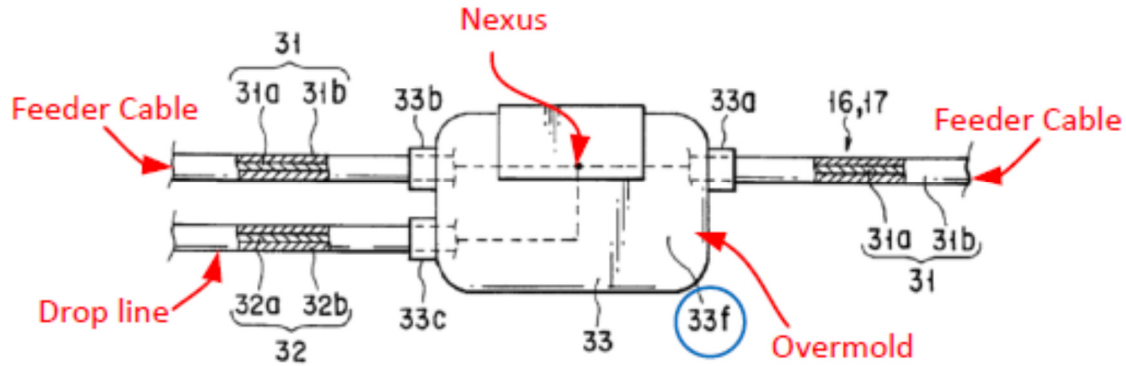


EX1006, FIG. 7 (1st-annotation)

Thus, element 1(a) is obvious based on Yamawaki. *Decl.* ¶[481].

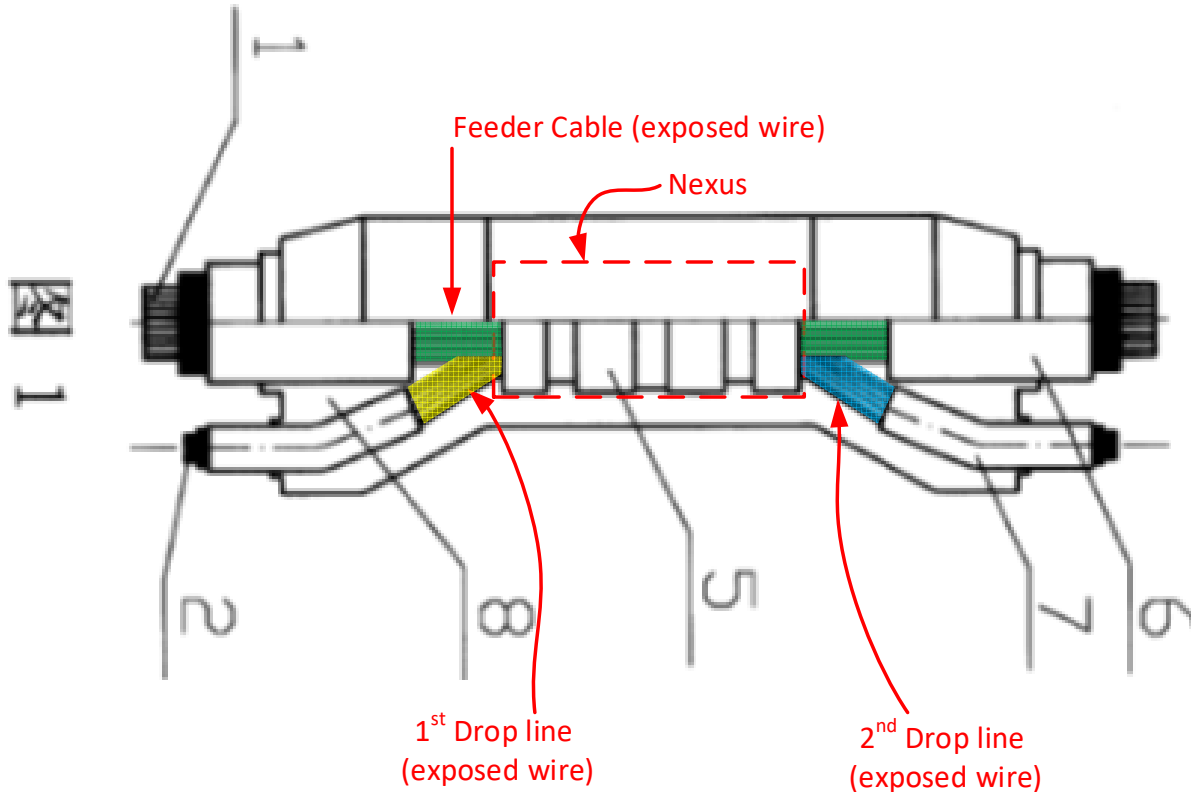
1(b)

Yamawaki discloses the electrical coupling of the feeder cable (trunk cable 31) and the drop line (branch cable 32) at a nexus. EX1006, FIG.9A; *Decl.* ¶[482].



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

To the extent that Yamawaki discloses but does not illustrate an electrical coupling between the feeder cable and drop line at the connecting point, Shao illustrates the electrical coupling of the feeder cable (trunk conductor 1) to the drop line (i.e., branch line conductor 2) at the nexus. *Decl.* ¶[483]. Shao includes a clamp (connector 5) holding the feeder cable in contact with the drop line. EX1008, FIG.1; *Decl.* ¶[484].



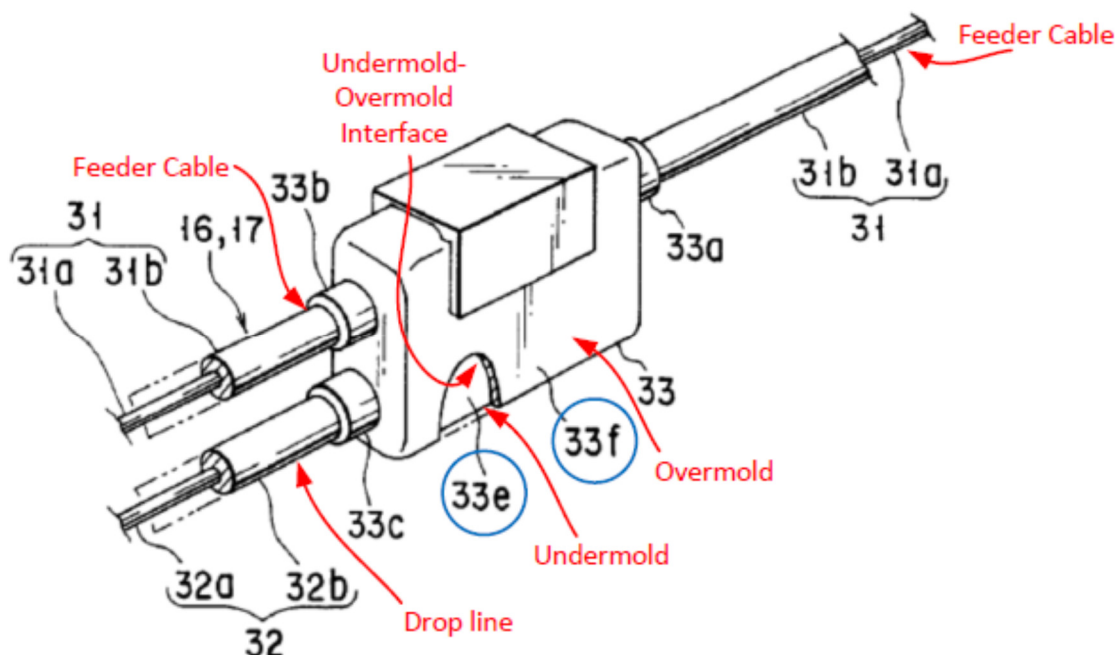
EX1008, FIG. 1 (1st-annotation)

A POSITA would have been motivated to use the coupling of Shao at the nexus of Yamawaki to ensure contact, good conductivity, and structural integrity is maintained between the two conductive elements. *Decl.* ¶¶[473],[484].

Thus, element 1(b) is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[485].

1(c)

Yamawaki discloses an undermold (i.e., molded body 33e) that fully encases the nexus, as discussed above regarding claim 1(b). EX1006, 10:19-32,13:15-18; *Decl.* ¶[486]. In particular, Yamawaki discloses that “each junction 33 includes a

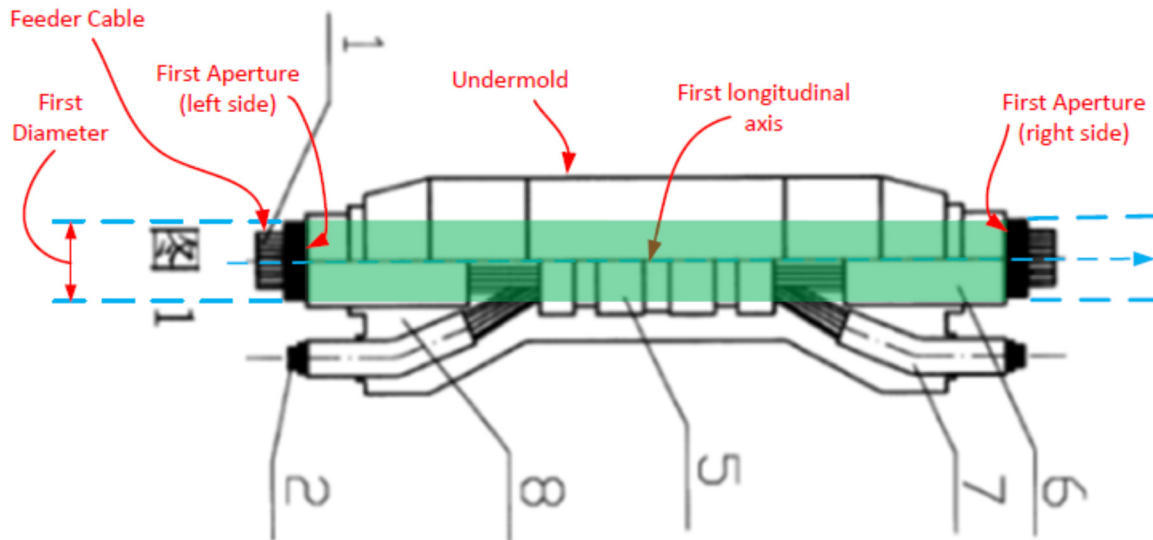


Thus, element 1(c) is obvious based on Yamawaki. *Decl.* ¶[487].

Yamawaki discloses that the feeder cable extends completely through the undermold (the junction), along a first axis, as well as an undermold that fully encases the nexus. EX1006, FIG.9A; *Decl.* ¶[488]. Similarly, Shao discloses that a first aperture of the undermold (connector outer sheath 8) extends completely through the undermold and has a first diameter, wherein the feeder cable extends

through the first aperture along a first longitudinal axis. EX1008, FIG.1; *Decl.*

¶[488].



EX1008, FIG. 1 (2nd-annotation)

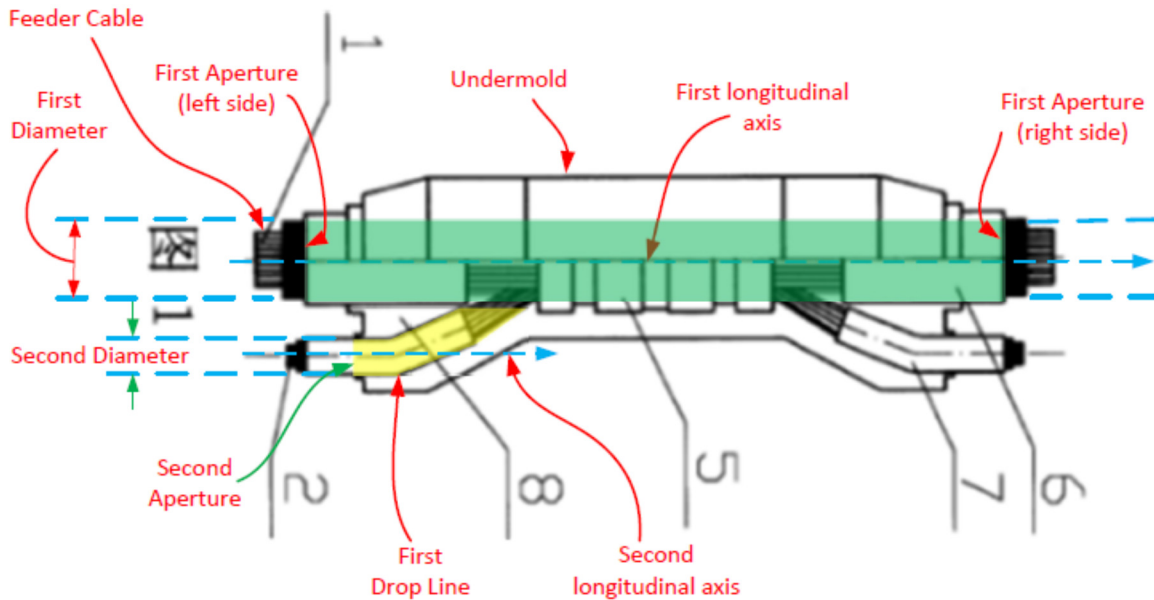
A POSITA would appreciate that Yamawaki and Shao describe methods for encasing cable junctions with insulating layers that can provide protection from the environment and other benefits (*see* “Motivation to Combine Yamawaki and Shao”). A POSITA considering Yamawaki and Shao would have found it obvious to replace the specific undermold design used by Yamawaki with that taught by Shao in order to provide a low-profile branch connection with added protection against environmental elements (e.g., waterproofing), as taught by Shao (*see* “Motivation to Combine Yamawaki and Shao”). *Decl.* ¶[489]. In particular, the benefits disclosed by Shao of its undermold include “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, 5:37-40; *Decl.* ¶[489]. A POSITA would understand that the combination of the undermold of Shao and the overmold of Yamawaki would provide complimentary and additive benefits, and that the sum of the benefits of the individual molds would lead to an improved product. *Decl.* ¶[489].

Thus, element 1(c)(i) is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[490].

1(c)(ii)

Shao discloses a second aperture extending partially through the undermold (connector outer sheath 8) and having a second diameter different than the first diameter, wherein the drop line extends from the second aperture along a second longitudinal axis as shown. EX1008, FIG.1; *Decl.* ¶[491].



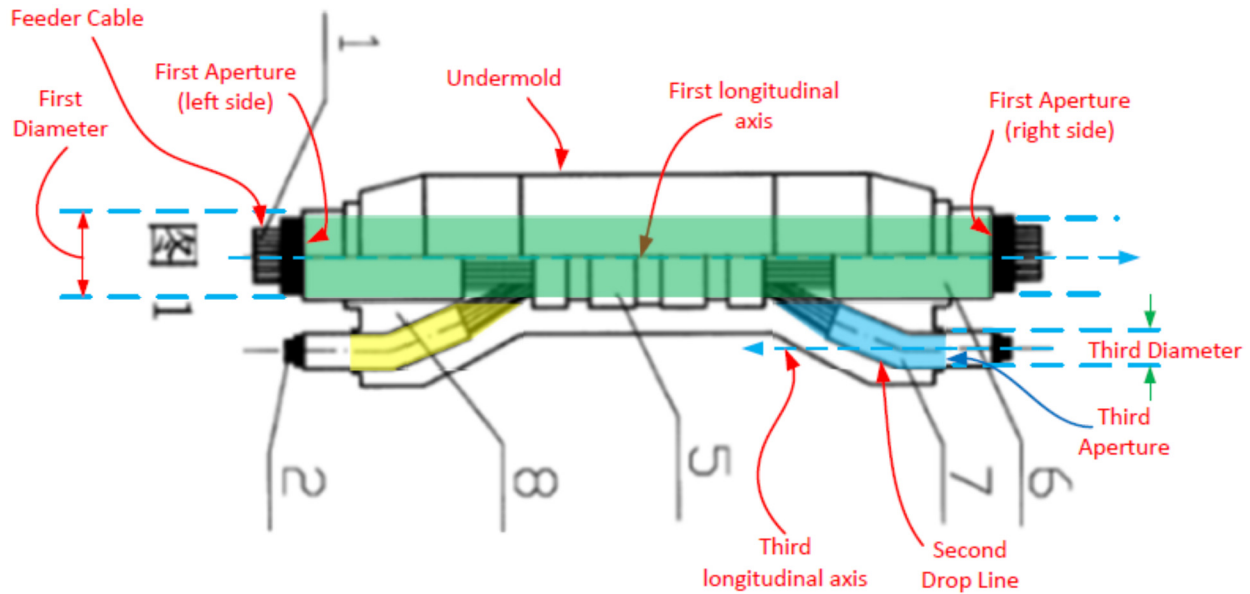
EX1008, FIG. 1 (3rd-annotation)

Thus, element 1(c)(ii) is obvious based on the Yamawaki-Shao combination.

Decl. ¶[492].

1(c)(iii)

Shao discloses a third aperture extending partially through the undermold (connector outer sheath 8) and having a third diameter different than the first diameter, wherein a second drop line extends from the third aperture along a third longitudinal axis. EX1008, FIG.1; *Decl.* ¶[493].



EX1008, FIG. 1 (4th-annotation)

Shao specifically discloses the connection of “[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.” EX1008, 6:18-21. Shao discloses a feeder cable (single trunk conductor 1) and a pair of drop lines (branch line conductors 2) that are brought together by the crimp (connector 5) to form the junction. EX1008, FIG.1(above); *Decl.* ¶[494]. This arrangement provides for a first aperture (through which the trunk conductor extends) and a second and third aperture (through which the two branch-line conductors extend). *Id.*

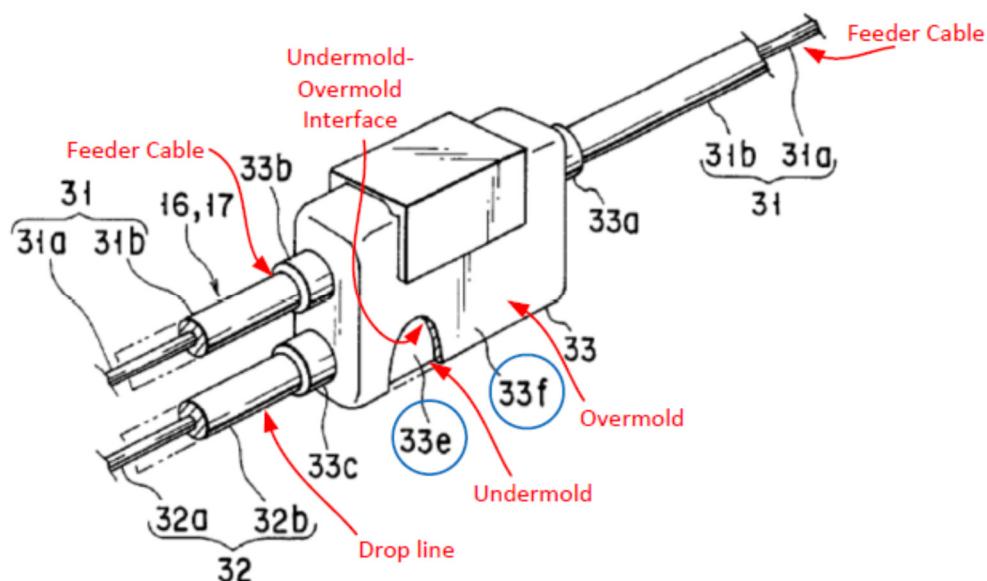
A POSITA considering the lead assembly disclosed by Yamawaki would be motivated to replace the two branch junctions (33) with a single low-profile bi-directional K-shaped branch taught by Shao to reduce the number of junctions

needed for the assembly. *Decl.* ¶[495]. Shao notes that the K-shaped branch connector structure “causes one branch joint to be reduced, the installation space occupation to be little and the wire to be concise.” EX1008, Abstract. A POSITA would appreciate that the structure of the K-shaped branch connector provides useful additional benefits that could be incorporated by modifying Yamawaki to include the K-shaped connectors disclosed by Shao. *Decl.* ¶[495]. Further, a POSITA would appreciate that the cover member of Yamawaki could be applied to the K-shaped connector disclosed by Shao by overmolding or fusing as described in Yamawaki. EX1006, 10:35-60; *Decl.* ¶[495].

Thus, element 1(c)(ii) is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[496].

1(d)

Yamawaki teaches applying an overmold over an undermold of a branch cable connection to provide an added layer of waterproofing. EX1006, 10:19-22,13:15-18; *Decl.* ¶[497]. In particular, Yamawaki discloses an overmold (covering member) on an undermold (molded underbody) covering a nexus (a branch junction) of cables (a feeder cable and a branch cable). EX1006, FIG-9B; *Decl.* ¶[497].



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

A POSITA would appreciate that Yamawaki and Shao both encase cable junctions with insulating layers that can provide protection from the environment and other benefits described above (*see* “Motivation to Combine Yamawaki and Shao”). *Decl.* ¶[473]. A POSITA considering Yamawaki and Shao would have found it obvious to maintain the overmold (cover member) taught by Yamawaki when adopting the undermold and connection design of Shao in order to maintain both the added protection against environmental elements (e.g., waterproofing) of Yamawaki and provide a low profile branch junction that occupies less space, as taught by Shao (*see* “Motivation to Combine Yamawaki and Shao”). *Decl.* ¶[498]-[499].

Thus, element 1(d) is obvious based on the Yamawaki-Shao combination.

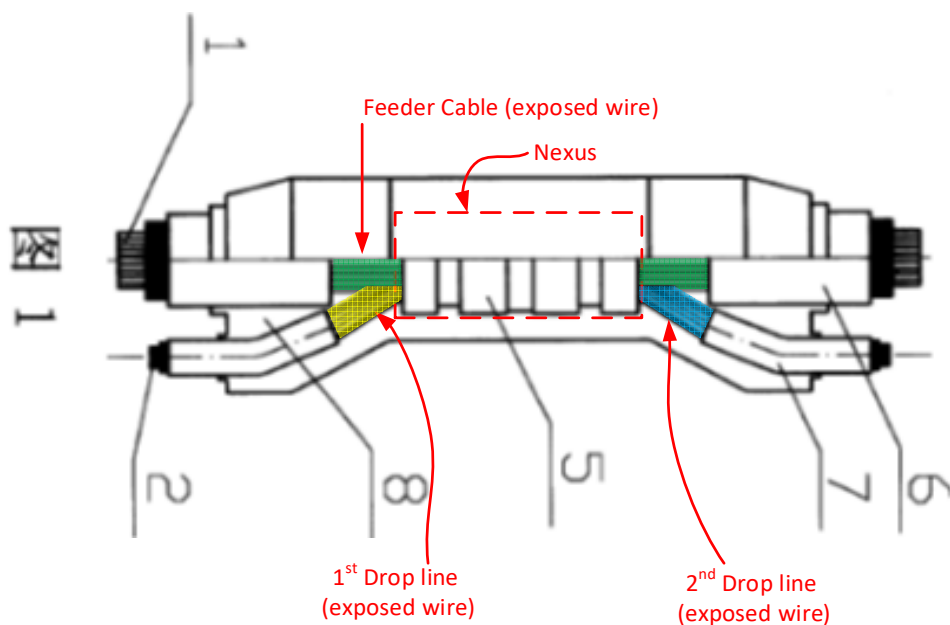
Decl. ¶[499].

Therefore, claim 1 is obvious based on the Yamawaki-Shao combination.

Decl. ¶[500].

2. Claim 2

Shao discloses that the drop line (branch-line conductors 2) includes a section of exposed wire (yellow) at the nexus. EX1008, FIG.1; *Decl.* ¶[501]-[502].



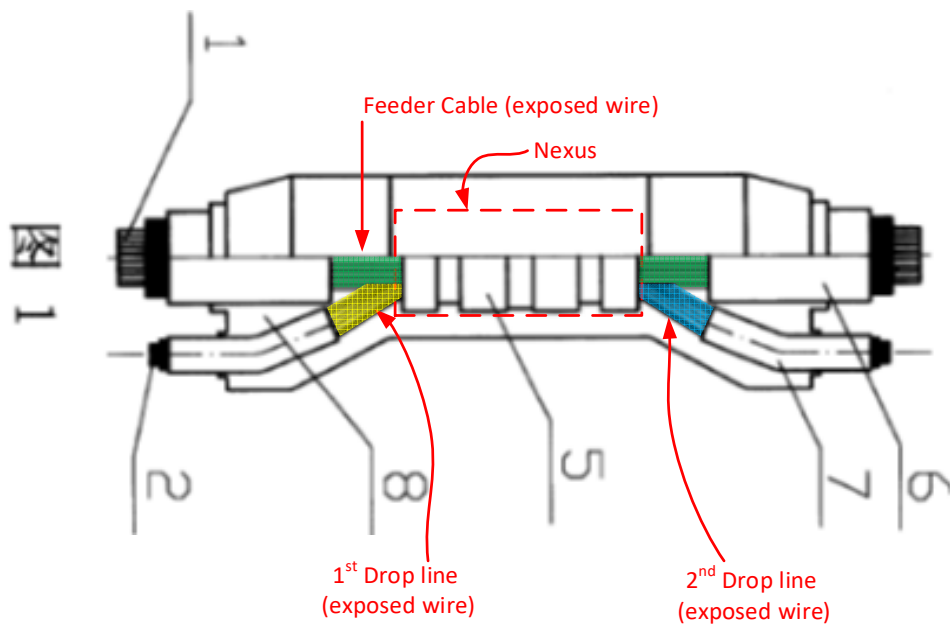
EX1008, FIG. 1 (1st-annotation)

Therefore, claim 2 is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[503].

3. Claim 3

Shao discloses, and shows in an illustration reproduced below, that the feeder cable (trunk conductor 1) includes a section of exposed wire (green) at the

nexus. EX1008, FIG.1; *Decl.* ¶[504]-[505].



EX1008, FIG. 1 (1st-annotation)

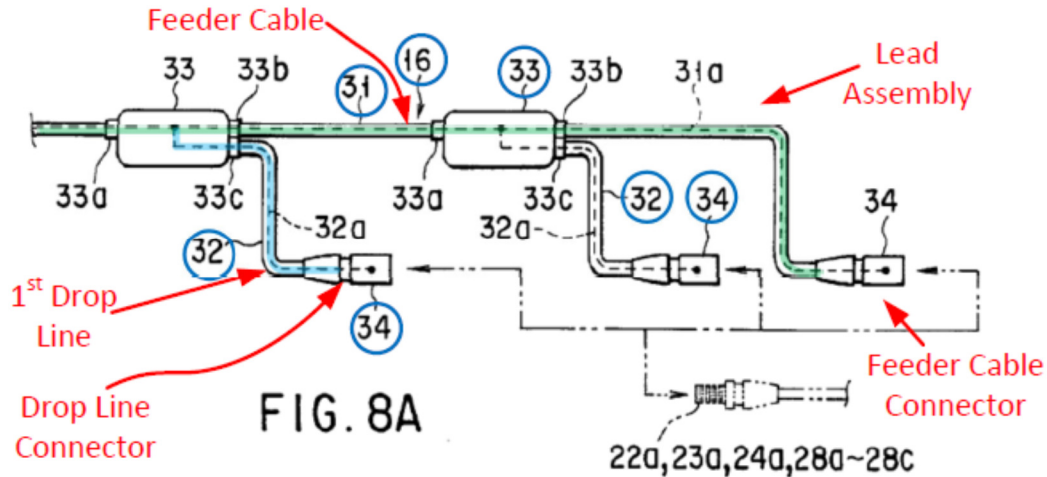
Therefore, claim 3 is obvious based on the Yamawaki-Shao combination.

Decl. ¶[506].

4. Claim 5

Yamawaki discloses, and shows in an illustration reproduced below, that the feeder cable (**trunk cable 31**) terminates at a feeder cable connector (connector 34).

EX1006, FIG.8A; *Decl.* ¶[507].



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

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

Decl. ¶[508].

5. Claim 6

Although the Yamawaki-Shao combination doesn't disclose the feeder cable connector attached directly to an inverter, this wiring configuration was well known to POSITAs. *Decl.* ¶[509] (citing EX1010). For example, a POSITA would have been familiar with the NEC 2002 which illustrates in Figure 690.1(B) of a main feeder cable of a branching "photovoltaic source circuit" connected directly to an inverter. *Decl.* ¶[509]; EX1010, Fig. 690.1(B), p.544.

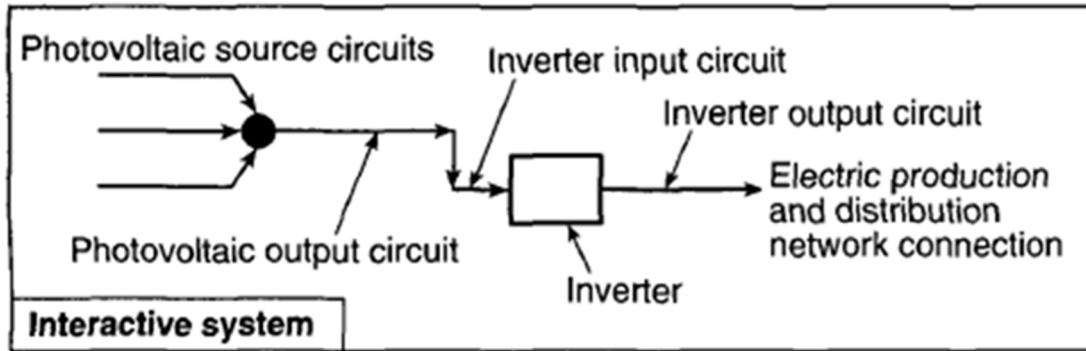


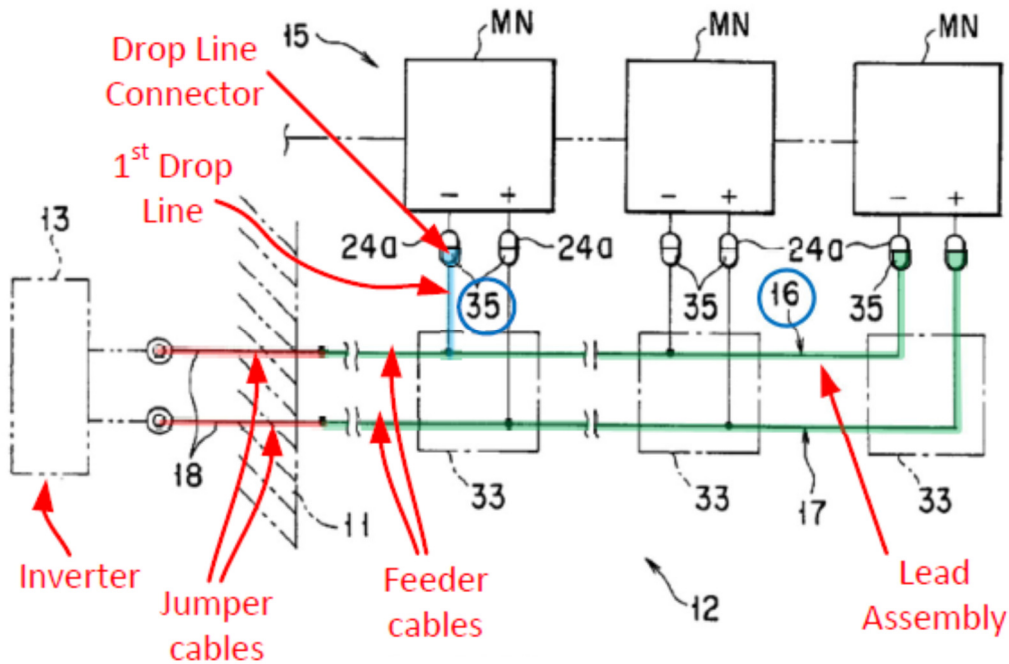
Figure 690.1(B) (top diagram)

Further, a POSITA would have been motivated to attach a feeder cable directly to an inverter, particularly for installations in which the inverter is in close proximity and can extend to be connected directly to feeder cable without the need for a jumper cable. *Decl.* ¶[510]-[511] (citing EX1010).

Thus, claim 6 is obvious based on the Amphenol-Shao-Yamawaki combination. *Decl.* ¶[512].

6. Claim 7

Yamawaki FIG. 2 (below) discloses attaching a feeder cable (16, 17) directly to a jumper cable (18) that connects to an inverter (13). EX1006, 7:45-8:11; *Decl.* ¶[513].



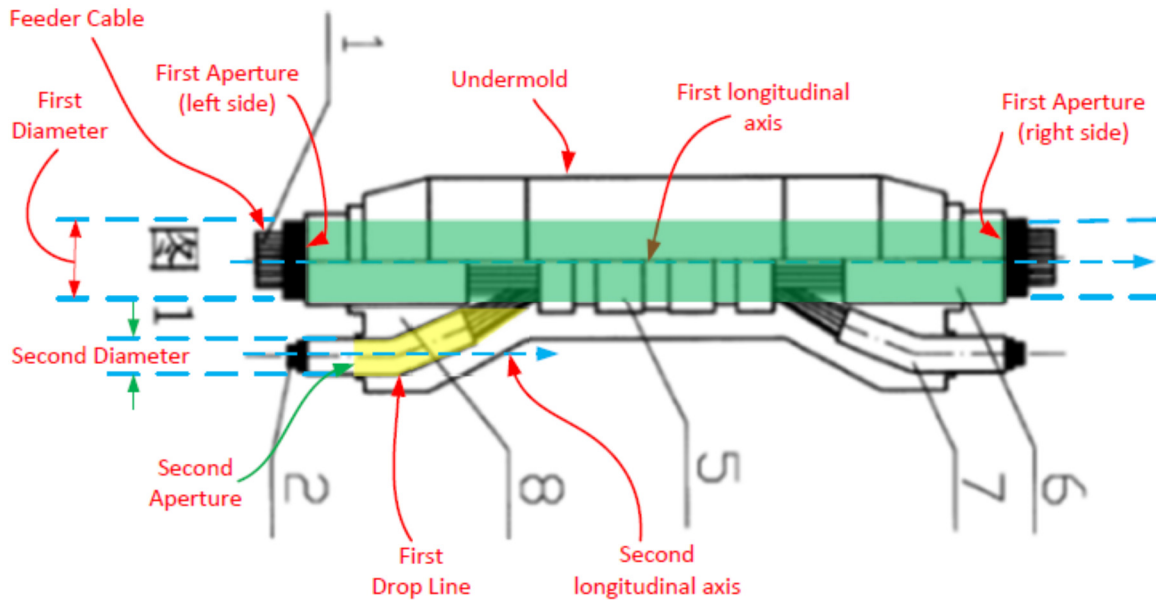
EX1006, FIG. 2 (1st-annotation)

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

Decl. ¶[514].

7. Claim 8

Shao discloses, and shows in an illustration reproduced below, that the first longitudinal axis (of the first aperture) and the second longitudinal axis (of the second aperture) are substantially parallel. EX1008, FIG.1. A POSITA would be motivated to use the undermold configuration, taught by Shao, to provide a low-profile assembly that takes up less room within an installation. *Decl.* ¶[515].



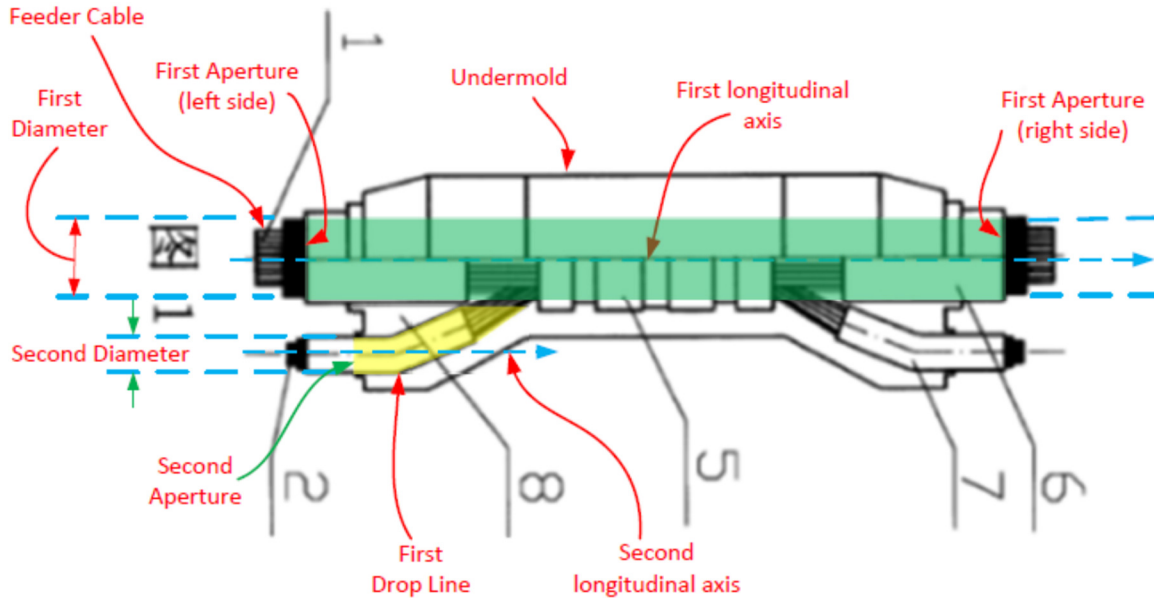
EX1008, FIG. 1 (3rd-annotation)

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

Decl. ¶[516].

8. Claim 9

Shao discloses that the second diameter (of the second aperture) is smaller than the first diameter (of the first aperture). EX1008, FIG.1; *Decl.* ¶[517].

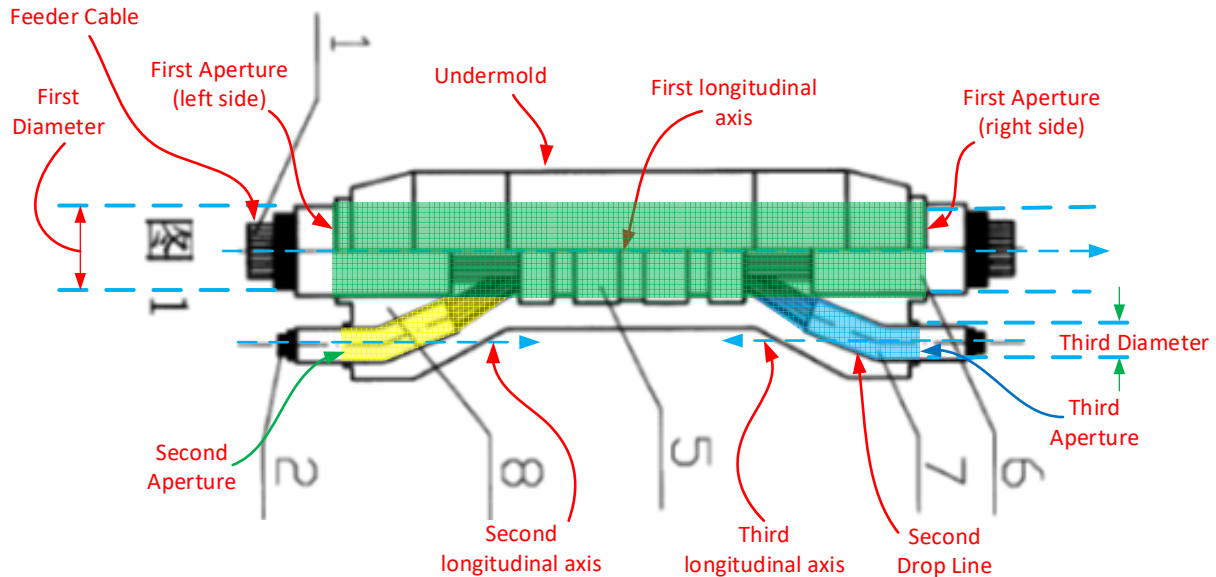


EX1008, FIG. 1 (3rd-annotation)

Further, a POSITA selecting cable sizes for solar installations would know from established electrical practices to use larger cables for feeder lines that carry more current than drop lines. *Decl.* ¶[518] (citing EX1010). Therefore, claim 9 is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[519].

9. Claim 10

Shao discloses that the third longitudinal axis is substantially concentric with the second longitudinal axis, and substantially parallel with the first longitudinal axis. EX1008, FIG.1; *Decl.* ¶[520].¶



EX1008, FIG. 1 (5th-annotation)

As discussed in Shao, and would be understood by a POSITA, it is convenient for the drop lines to be arranged symmetrically and in parallel with the feeder cables in a solar installation like that of Yamawaki, since the cables can be routed in parallel and tied together to organize the cables in a large-scale installation. EX1008, Abstract; *Decl.* ¶[521].

Therefore, claim 10 is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[522].

10.Claim 12

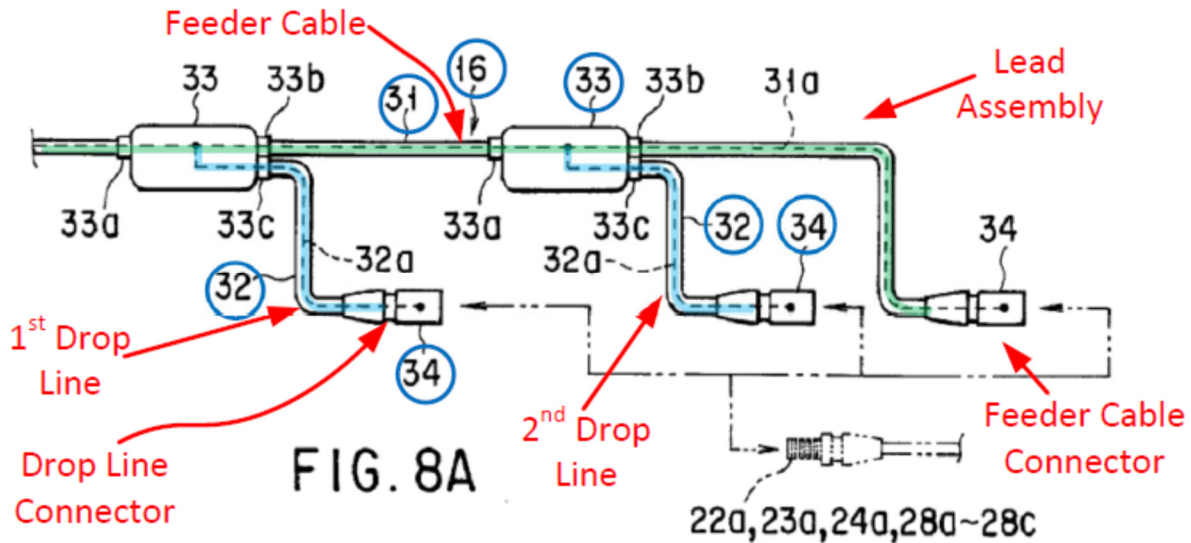
See Ground 6, claim elements 1(a) and 1(b), and claim 7. *Decl.* ¶[523].

11.Claim 13

Yamawaki discloses that all the drop lines (branch cables 32) terminate at a

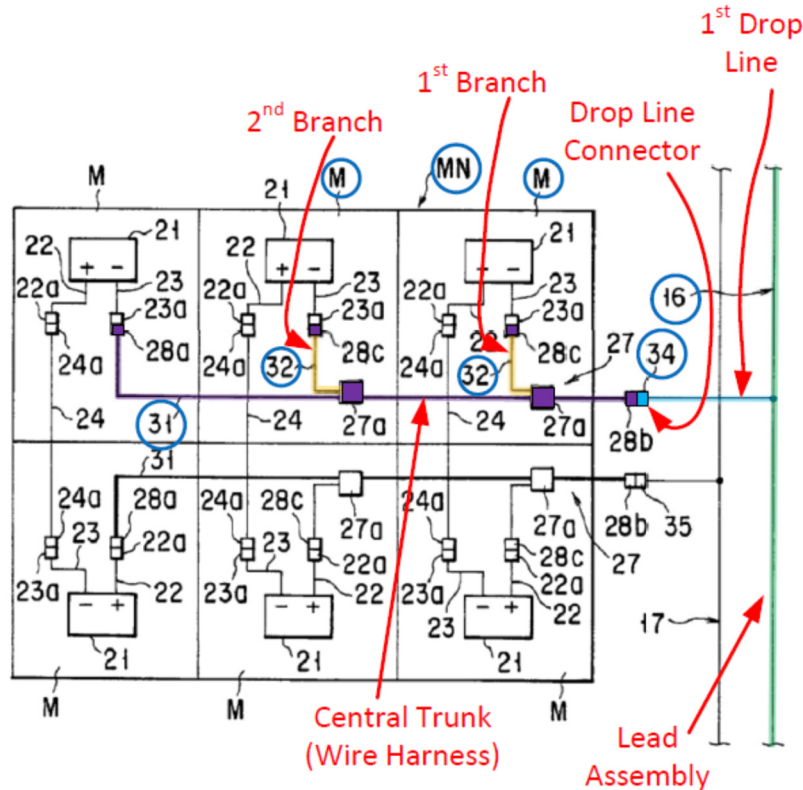
drop line connector (i.e., connectors 34, 35). EX1006, 18:36-38, FIG. 8A; Decl.

¶[524].



EX1006, FIG. 8A (2nd-annotation)

Also, Yamawaki discloses that the first drop line (i.e., left side branch cable 32, above) and the second drop line (i.e., right side branch cable 32, above) are each configured to connect, via the drop line connectors (34) to separate wire harnesses that connect to separate solar panel arrays. EX1006, 8:49-58, FIG. 7, 8A; Decl. ¶[525]. In FIG. 7, Yamawaki discloses that each drop line connector (i.e., connector 34) of the lead assembly (i.e., wiring apparatus 16) is connected to a central trunk (trunk cable 31) of a wire harness. EX1006, FIG. 7; Decl. ¶[525].



EX1006, FIG. 7 (1st-annotation)

The various diagrams provided by Yamawaki enable a designer to design a cable harness system appropriate to match the solar array installation (e.g., a second array of solar cells). EX1006, FIGS.1-8B; *Decl.* ¶[526]. Yamawaki provides flexible building blocks (cables, junctions, connectors, etc.) that are designed to be assembled into many different configurations including that claimed here. *Decl.* ¶[526].

By combining Shao and Yamawaki, a POSITA would preserve the range of overall system designs enabled by Yamawaki, which provide the improved reliability and performance that is associated with the detailed junction design and undermold/overmold designs disclosed in Shao. *Decl.* ¶[527]. For example, by

incorporating the undermold (connector outer sheath 8) taught by Shao into the lead assembly (wiring apparatus 16, 17) disclosed by Yamawaki, the two drop lines (branch cables 32) would branch from the same nexus for providing a more compact and efficient configuration. EX1008, 5:27-30; *Decl.* ¶[527].

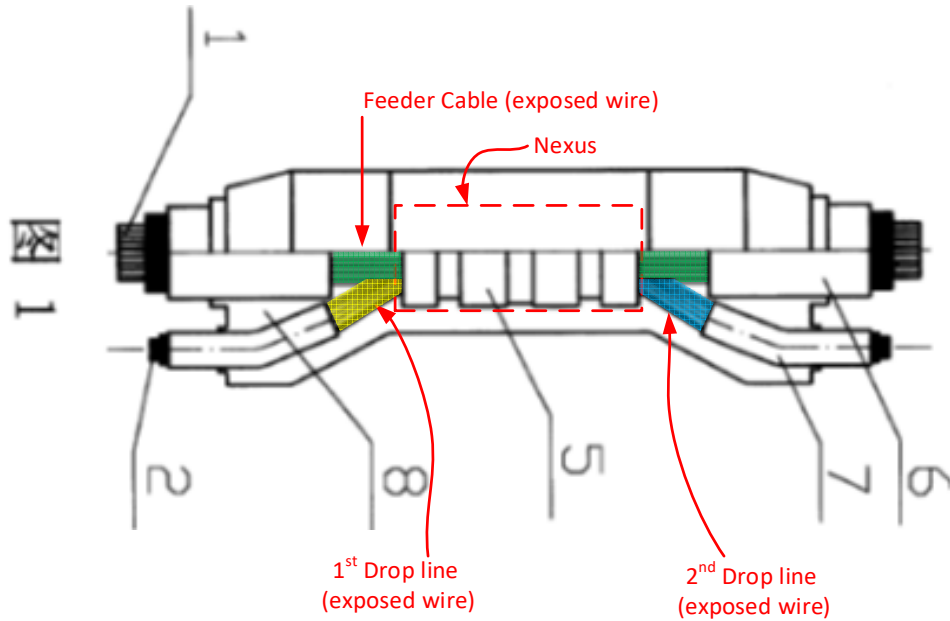
Therefore, claim 13 is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[528].

12.Claim 14

See Ground 5, claims 7, 12, and 13. *Decl.* ¶[529].

13.Claim 15

Shao discloses that the second drop line includes a section of exposed wire (in blue) at the nexus so as to be electrically connected to the feeder cable (in green). EX1008, FIG.1; *Decl.* ¶[530]-[531].



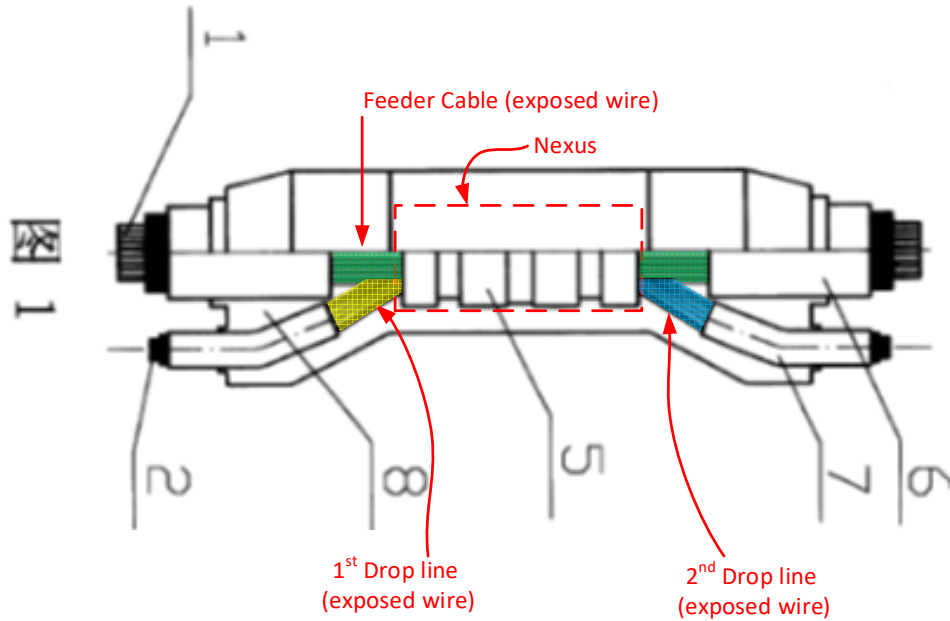
EX1008, FIG. 1 (1st-annotation)

Therefore, claim 15 is obvious based on the Yamawaki-Shao combination.

Decl. ¶[532].

14.Claim 18

Shao discloses that “an elongated copper C-shaped clamp is used to form a K-shaped branch connector 5,” which maintains an engagement between the feeder cable and the drops lines at the nexus. EX1008, p.6,FIG.1. A POSITA would recognize this cable and line as “crimped.” *Decl.* ¶[533]-[534].



EX1008, FIG. 1 (1st-annotation)

Therefore, claim 18 is obvious based on the Yamawaki-Shao combination.

Decl. ¶[535].

15.Claim 19

Although Yamawaki discloses that the undermold (i.e., the molded body 33e) is “molded,” Yamawaki doesn’t say it is injection molded. EX1006, 10:19-22. Shao discloses a feeder cable coupled 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, p.5. 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 is better protected from damage and/or exposure (*see* “Motivation to Combine Yamawaki and Shao’ further discussed

above). *Decl.* ¶[536].

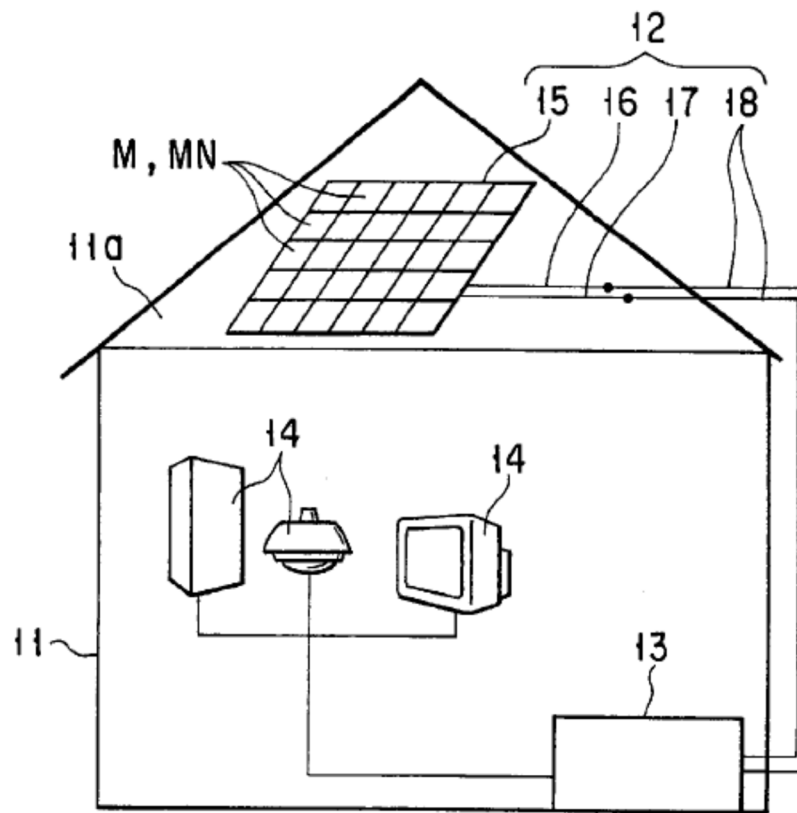
Therefore, claim 19 is obvious based on the Yamawaki-Shao combination.

Decl. ¶[537].

16.Claim 21

Preamble

See Ground 5, claim element 1(Preamble) and Yamawaki discloses a solar power system. EX1006, 3:9-11,FIG.1; *Decl.* ¶[538].



EX1006, FIG. 1

Thus, the claim 21(Preamble) is obvious based on Yamawaki. *Decl.* ¶[539].

21(a)

See Ground 5, claim element 1(a). *Decl.* ¶[540]-[541].

21(b)

See Ground 5, claim element 1(Preamble). *Decl.* ¶[542].

21(b)(i)

See Ground 5, claim element 1(a). *Decl.* ¶[543].

21(b)(ii)

See Ground 5, claim element 1(c)(iii) and claim 13. *Decl.* ¶[544].

21(b)(iii)

See Ground 5, claim elements 1(b), 1(c)(iii) and claim 18. *Decl.* ¶[545]-
[547].

21(b)(iv)

See Ground 5, claim element 1(c) and claim 18. *Decl.* ¶[548]. Note that
“primary mold” recited in claim 21 has the same meaning as “undermold” in claim
1. *See* IV. E. Claim Construction.

21(b)(iv)(1)-(3)

See Ground 5, claim 1(c)(i), 1(c)(ii), and 1(c)(iii). *Decl.* ¶[550].

Therefore, claim 21 is obvious based on the Yamawaki-Shao combination. *Id.*

17.Claim 22

See Ground 5, claims 6, 7, 12, and 14. *Decl.* ¶[551].

18.Claim 23

See Ground 5, claim element 1(d). *Decl.* ¶[552].

19.Claim 24

Preamble

See Ground 5, claim element 1(Preamble) and 21(Preamble). *Decl.* ¶[553].

24(a)

See Ground 5, claim element 1(a). *Decl.* ¶[554].

24(b)

See Ground 5, claim element 1(Preamble) and 21(Preamble). *Decl.* ¶[555].

24(b)(i)

See Ground 5, claim element 1(a). *Decl.* ¶[556].

24(b)(ii)

See Ground 5, claim element 1(b). *Decl.* ¶[557].

24(b)(iii)

See Ground 5, claim element 1(c) and claim 18. *Decl.* ¶[558]. Note that “primary mold” recited in claim 24 has the same meaning as “undermold” in claim 1. *See* IV. E. Claim Construction.

24(b)(iii)(1)

See Ground 5, claim element 1(c)(i). *Decl.* ¶[559].

24(b)(iii)(2)

See Ground 5, claim element 1(c)(ii). *Decl.* ¶[560].

24(b)(iv)

See Ground 5, claim element 1(c)(iii). *Decl.* ¶[561].

Accordingly, claim 24 is obvious based on the Yamawaki-Shao combination. *Decl.* ¶[562].

F. Ground 6: Claims 11, 16, and 17 are unpatentable under 35 U.S.C. § 103 as obvious in view of Yamawaki, Shao, and Solon741.

• Motivation To Combine Yamawaki, Shao, and Solon741

A POSITA would have been motivated to combine the teachings of Yamawaki and Shao with those of Solon741 (i.e., the “Yamawaki-Shao-Solon741 combination”) for the reasons set forth below.

As noted above regarding Ground 5, the Yamawaki-Shao combination discloses that wire harness and lead assembly designs disclosed by Yamawaki would benefit from the features disclosed by Shao. *Decl.* ¶[564]. Solon741 is cited in Ground 6 to teach features not explicitly taught in the Yamawaki-Shao combination including drop lines that include a fuse, a particular wire gauge for the drop lines, or a particular wire size for the feeder cable. Solon741 is analogous prior art to the '153 Patent as explained regarding the motivation to combine in Ground 1. *Decl.* ¶[565]-[568].

Solon741 also adds the element of inline fuse holders. In particular, Solon741 discloses that, “[t]he in-line fuse assembly may include a variety of fuse types, such as midget fuses and/or 1000-V fuses.” EX1005, ¶[0013]. Further, Solon741 discloses current ranges of “an ampacity of 2 to 30 amps” which a POSITA would have understood as a common operating range for these solar power installations. *Id.*, ¶[0032]; *Decl.* ¶. Similarly, Solon741 discloses fuse voltage ranges of 500 – 1500 V and 600 – 1000V. *Id.*, ¶[0030]. These features are compatible with the analogous and solar installations of Yamawaki. *Decl.* ¶[569]

A POSITA would have been motivated to look to Solon741 to solve any of the problems with solar installations that are identified in Solon741 including improving installation efficiency of fuses, protection of the in-line fuse, and wires/fuses for supporting the operating ranges common in these facilities. EX1005, ¶¶[0013],[0030],[0034]; *Decl.* ¶¶[569]-[570]. Therefore, a POSITA would have been motivated to incorporate these features into the Yamawaki-Shao combination to the extent they were not already supported / implemented inherently. *Decl.* ¶[570]. These components are compatible with those of Yamawaki and Shao as described in the motivation to combine for Ground 1.

1. Claim 11

Solon741 discloses drop lines (branches 12 of the wire harness 10) that each include one in-line fuse assembly 20, so wire harness 10 includes a plurality of in-

line fuse assemblies 20 connected to branch wire 58 to a solar cell. EX1005,

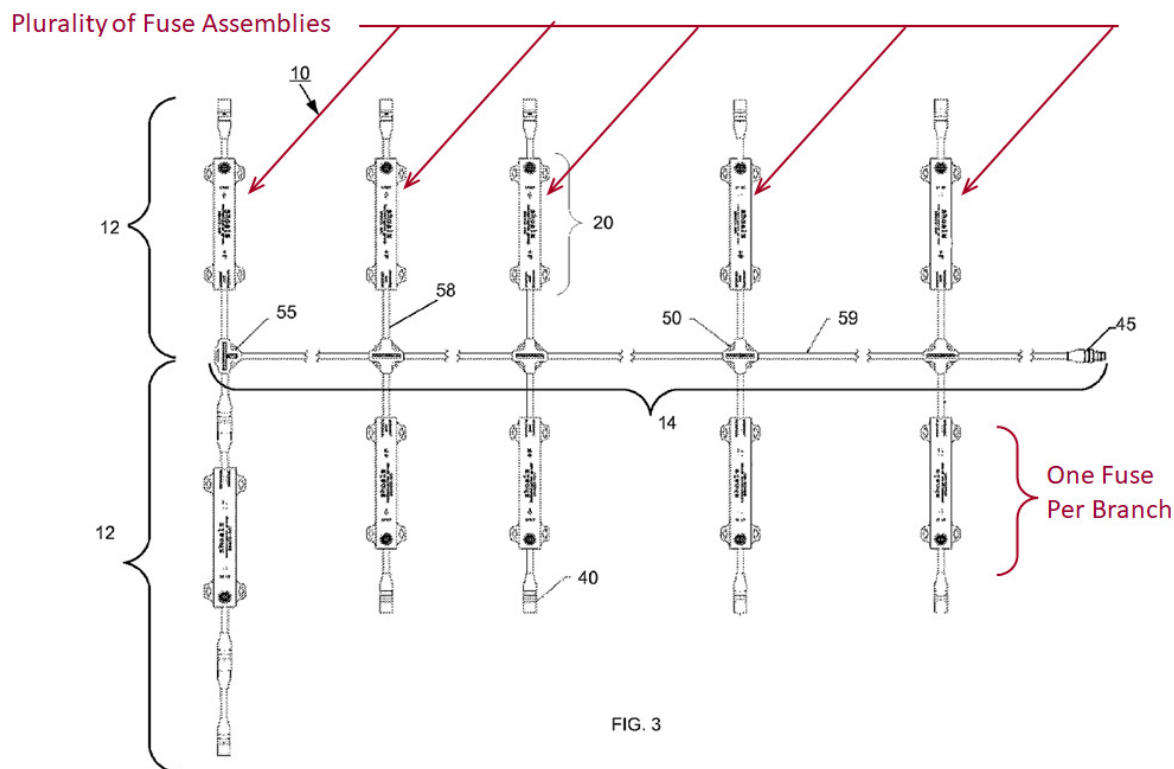
¶[0030], FIG. 3; *Decl.* ¶[571]. A POSITA would have understood that Yamawaki

and Shao are both complimented by the solar panel wiring harness with in-line fuse

disclosed by Solon741. A POSITA would have been motivated to add the inline

fuse bodies of Solon741 to increase the fault tolerance and efficiency of the solar

installation as taught by Solon741. EX1005, ¶[0034]; *Decl.* ¶[571].



EX1005, FIG. 3 (2nd-annotation)

Therefore, claim 11 is obvious based on the Yamawaki-Shao-Solon741 combination. *Decl.* ¶[571].

2. Claim 16

Solon741 discloses that the drop lines (i.e., branches 12) may be constructed

of 10 or 12 gauge photovoltaic wire. EX1005, ¶[0029]. A POSITA would understand that an appropriate drop line gauge should be selected for the intended use based on the National Electric Code. EX1010, p.149; *Decl.* ¶[572] (citing EX1010). Therefore, claim 16 is obvious based on the Yamawaki-Shao-Solon741 combination. *Decl.* ¶[573].

3. Claim 17

See Ground 1, claim 17 which explains how these limitations are obvious in view of Solon741 and the National Electric Code (NEC). For a POSITA, this is a known and predictable modification that is driven by the amperage and voltage disclosed in Solon741. EX1005, ¶¶[0030],[0033]; *Decl.* ¶¶[574]-[575].

Therefore, claim 17 is obvious based on the Yamawaki-Shao-Solon741 combination. *Decl.* ¶[576].

G. Ground 7: Claim 20 is unpatentable under 35 U.S.C. § 103 as obvious in view of Yamawaki, Shao, and Tamura.

- **Motivation To Combine Yamawaki, Shao, and Tamura**

A POSITA would have been motivated to combine Tamura with Yamawaki and Shao (i.e., the “Yamawaki-Shao-Tamura combination”) for the same reasons discussed above with regard to the Amphenol-Shao-Yamawaki-Tamura combination (*see* “Motivation to Combine Amphenol, Shao, Yamawaki, and Tamura” discussed above regarding Ground 4) and the Amphenol-Shao-Solon741

combination (*see* “Motivation to Combine Amphenol, Shao, and Solon741”

discussed above regarding Ground 5). *Decl.* ¶[578].

Tamura discloses a cable assembly that provides “high waterproofing performance by virtue of a double waterproof effect.” EX1009, ¶[0017]. The disclosure of Tamura is in the same field of electrical connectors and solar installations as the ’153 Patent and, is thus analogous prior art. EX1009, ¶[0003]; *Decl.* ¶[569],[578]. Tamura also discloses a double-molded structure that provides improved protection from water. EX1009, ¶[0017]. Accordingly, a POSITA would have been motivated to add the methods of Tamura as further improvements to the two-layer protection of the Yamawaki-Shao combination by providing a 2-layer molding process offers better reliability and performance because a “double waterproof effect.” EX1009, ¶[0017]; *Decl.* ¶[579]-[581].

1. Claim 20

Tamura discloses applying an injection molded overmold over an undermold of a branch cable connection to provide an added layer of waterproofing. EX1009, ¶¶[0011],[0015]-[0017]. In particular, Tamura discloses adding an injection-molded outer mold part 12 (an overmold) over an inner mold part 11 (i.e., an undermold). EX1009, ¶¶[0014],[0020]-[0021]. It would have been obvious to a POSITA to form the overmold of Yamawaki with its added protection against environmental elements via an injection mold process as taught by Tamura for

better adhesion and waterproofing (*see* “Motivation to Combine Yamawaki, Shao, and Tamura”). *Decl.* ¶¶[582]-[583].

Therefore, claim 20 is obvious based on the Yamawaki-Shao-Tamura combination. *Decl.* ¶¶[583].

H. Ground 8: Claims 1-24 are unpatentable under 35 U.S.C. § 112 as being indefinite and for failing to meet the written description requirement.

Every claim of the ’153 Patent is invalid under 35 U.S.C. § 112 both for failure to satisfy the written description requirement, and as indefinite because the intrinsic record fails to inform a POSITA, with reasonable certainty, how to determine whether an “aperture” extends completely through or partially through the [undermold / primary mold] as required by every claim in the ’153 Patent.

Decl. ¶¶[585]. To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention.

B.V. v. Diamond Automation, Inc., 325 F.3d 1306, 1319 (Fed. Cir. 2003); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991). Further, for a claim to be sufficiently definite the claim viewed in light of the intrinsic evidence must “inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). If

it does not, the claim fails § 112(b) and is invalid as indefinite.

Where a term in a claim is subjective, the court must determine whether the “specification supplies some standard for measuring the scope of the [term].”

Datamize, LLC v. Plumtree Software, Inc., 417 F.3d 1342, 1351 (Fed. Cir. 2005).

The standard “must provide objective boundaries for those of skill in the art.”

Interval Licensing LLC v. AOL, Inc., 766 F.3d 1364, 1371 Fed. Cir. 2014). “A

patent claim is ‘indefinite’ if its language might mean several different things and no informed and confident choice is available among the contending definitions.”

HZNP Medicines LLC v. Actavis Laboratories UT, Inc., 940 F.3d 680, 698 (Fed. Cir. 2019).

The term “aperture” is used throughout the claims of the ’153 Patent to describe the structure of the undermold in independent claim 1 and the primary mold in independent claims 21 and 24. *Decl.* ¶[586]. It is not the same “aperture” described in the specification, which is identified as “25-Aperture” in the list of “structure numbers” in the specification and discussed in a single sentence:

“[o]vermold 24 preferably defines at least one aperture 25 for receiving zip-ties, and the like, for securing the assembly upon installation.” *See EX1001*, 4:6-29; 4:61-63; *Figs. 8, 11, 29 (showing 25-Aperture structure as an external attachment aperture)*; *Decl.* ¶[586].

The specific aperture structures in the claims of the ’153 Patent were

introduced by the Examiner for the '254 patent. EX1021 pp.103-105. In order to overcome prior art references that rendered previous drafts of claims for the '254 invalid, the Examiner (not the Applicant) proposed a new 113-word amendment, that would bring some of the then-pending claims of the '254 application into condition for allowance. *Id.* The Examiner-proposed amendment to the already claimed undermold included new aperture structures with specific characteristics, which included the “first aperture extending continuously through said undermold” and “second aperture only partially extending through said undermold.” *Id.* With the Examiner-proposed amendment, the '254 Patent also requires the second aperture and first aperture be parallel, that they extend in the same longitudinal direction, and they be concentric with other structural components of the lead assembly. *See id.* The patent owner accepted the Examiner-proposed amendments without modification. *Id.*, pp.76-78.

The amended claims issued into the '254 Patent and the applicant carried forward these aperture structure limitations into the originally proposed claims for the '153 Patent, as shown below. EX1020 pp.31-32.

*Petition for Post Grant Review of
U.S. Patent No. 11,689,153*

1. A lead assembly for use in a solar energy installation including: A. A first drop line and a second drop line, said first drop line terminating in a drop line connector; 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; C. A means for securing said nexus, said securing means selected from the group consisting of compression lug, soldering, splicing, crimping, and combinations thereof; 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; and E. An overmold surrounding said undermold and forming an undermold-overmold interface only at said outer surface, 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 wherein said lead assembly has a voltage rating of 1500 VDC.	1. A lead assembly for use in a solar energy installation including: a drop line; a feeder cable electrically coupled to the drop line at a nexus; an undermold that fully encases the nexus, the undermold further comprising: a first aperture extending completely through the undermold and having a first diameter, wherein the feeder cable extends through the first aperture along a first longitudinal axis; and a second aperture extending partially through the undermold and having a second diameter different than the first diameter, wherein the drop line extends from the second aperture along a second longitudinal axis; and an overmold surrounding the undermold and forming an undermold-overmold interface at an outer surface of the undermold.
EX1020, claim 1 (issued on 4/23/21)	EX1002, p. 40 (originally filed claim 1 in '153 Application filed on 4/8/21)

The Examiner did not provide any explanation to support the understanding of the aperture claim language that the Examiner proposed. EX1021 pp.103-105. Further, the Examiner did not reference any language or figures from the specification to support this new claim language, and the Examiner did not provide any explanation of how this new language led to claim allowance over the prior art examples cited during prosecution. *Id.* Nor did the Applicant, in its office action response adopting the proposed amendments, provide any explanation on how the

Applicant understood the proposed amendments. EX1021 *pp.*76-78. Rather, the Applicant simply remarked that it was offering the specific claim amendments that Examiner Smith indicated would bring the case into condition for allowance. *Id.* In addition, missing from the Applicant's response was the statement "[n]o new matter has been introduced," a representation the Applicant previously made in response to other Office Actions. Here though, it was the Examiner, not the Applicant, proposing the amendments. The Applicant presumably did not understand the scope of the proposed amendments, only that the Examiner would allow them.

As a result, the intrinsic record offers no guidance to a POSITA on how to understand the aperture structures within the claimed molds, and specifically, how to determine whether an aperture extends completely through or partially through said mold. *Decl.* ¶[590]. At best, Figure 7 of the '153 patent provides some support that the inventor had possession of a single drop lead assembly wherein a drop line extends partially through the undermold. *Decl.* ¶[609]. However, there is no similar depiction of the mold structure in which an aperture would be formed for the claimed dual drop embodiment. *See id.* The figures in the '153 patent fail to convey to one of ordinary skill in the art that the inventor was in possession of a dual drop embodiment with apertures that partially extend through a mold, particularly as to how the aperture would form over one or two drop line cables,

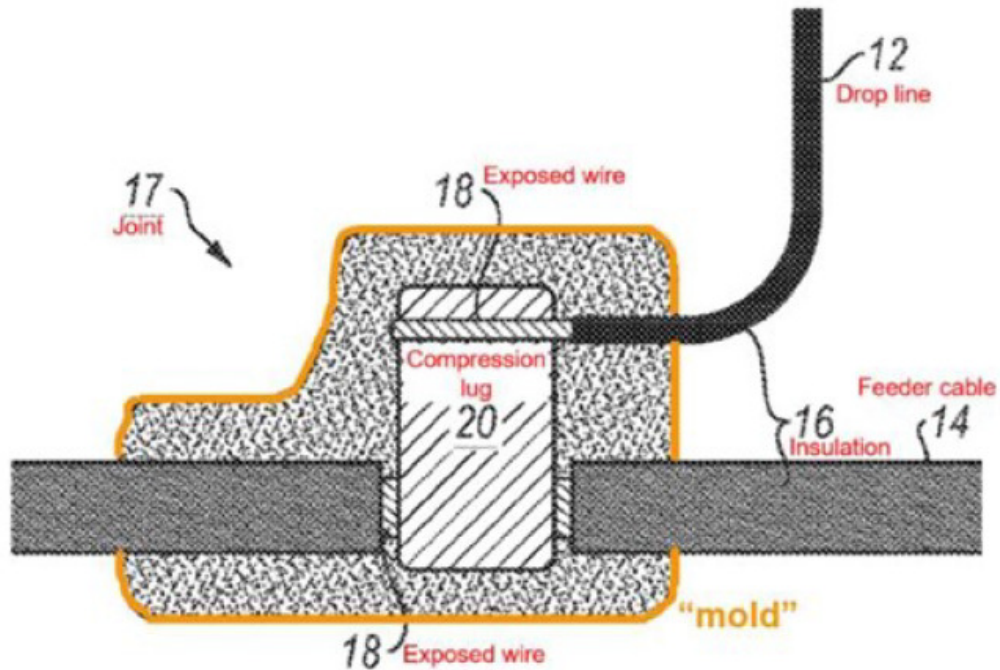
how and where the apertures are, or are not, in contact with the mold, and whether and how the aperture in the mold would be extending partially through the mold—rather than an aperture extending completely through the mold. *Decl.* ¶[609]. Accordingly, Claims 1-24 of the '153 patent are invalid for failing to meet the written description requirement. *B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1319 (Fed. Cir. 2003); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991). *Id.*

Shoals' shifting positions in the ITC provide further confirmation that not only do the '153 patent claims suffer from a lack of written description, but the claims are further indefinite, because a POSITA cannot, with reasonable certainty, determine whether an aperture extends completely through or partially through the mold. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 911 (2014) ("It cannot be sufficient that a court can ascribe some meaning to a patent's claims; the definiteness inquiry turns on the understanding of a skilled artisan at the time of the patent application, not that of a court viewing matters post hoc.").

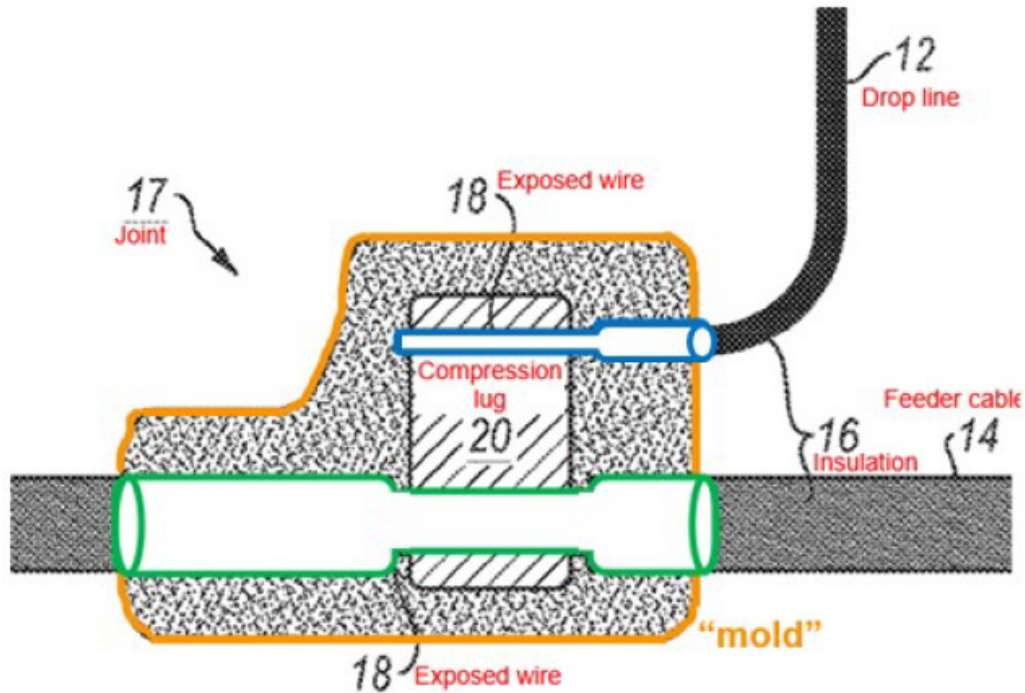
The limited disclosure in the '153 Patent and prosecution history leaves a POSITA to speculate as to what is the proper understanding or "test" to determine whether an "aperture" extends partially through (or completely through) the [undermold / primary mold]. *Decl.* ¶[591]. Five potential tests are identified below, and first applied to Figure 7 of the 153 Patent, the only figure that depicts

the internal structure of the [undermold / primary mold]. Decl. ¶[592]. Annotated

Figure 7 is shown below:



“Entire Cables Removed Test”: applying the definition of “aperture” of a “3-D hole (in other words, the entire pathway for a cable in the [undermold / primary mold]) that exists when viewed as if the entire cable is removed” annotated Figure 7 with the underlying cables removed is shown below with the entire pathway of the feeder cable outlined in **green** and the entire pathway of the drop line cable outlined in **blue**:



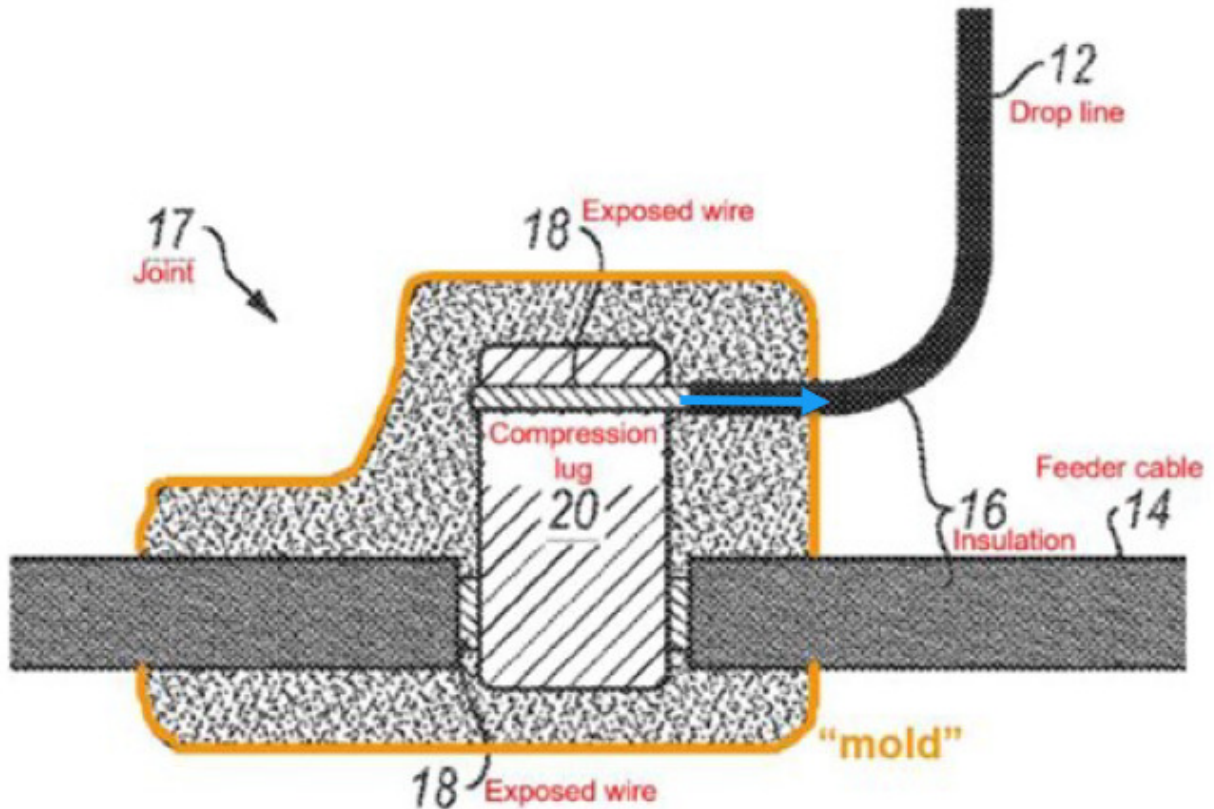
Using the “Entire Cables Removed Test”, the first aperture (associated with the feeder cable) extends completely through the mold and the second aperture (associated with the drop line cable) extends partially through the mold. *Decl.* ¶[593]-[595].

“See Through Test”: this test considers whether the opening into the [undermold / primary mold] follows a straight line such that one could “see through” the opening and out the other side of the mold. If yes, the aperture extends completely through, such as in the case of the first aperture above defined by the **green** outline. If not, the aperture extends partially through, such as in the case of the second aperture above defined by the **blue** outline. *Decl.* ¶[596].

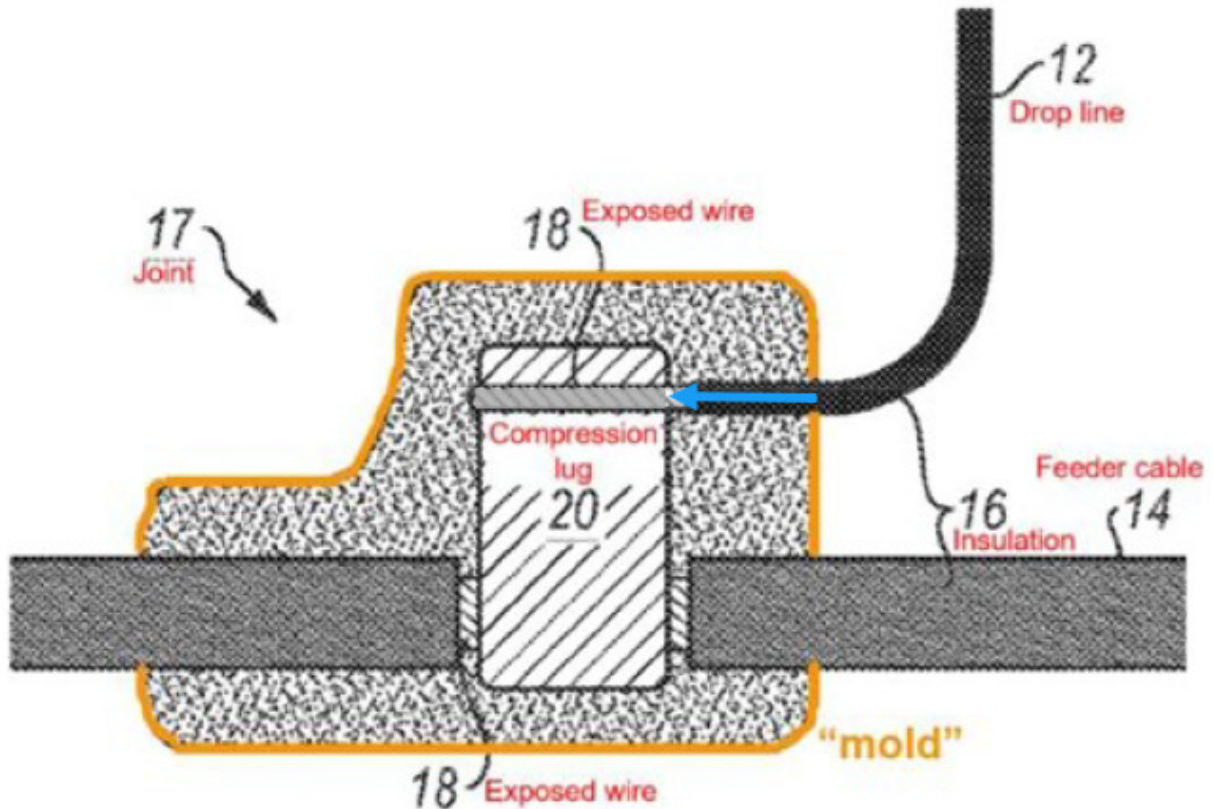
“Cable Test”: this test is a modification of the “Entire Cable Removal Test”

in that it simply follows the entire pathway of a cable (and ignores any pathways of any other cables within the mold when viewed as if they were removed too). As applied in the above Figure 7, the result is the same: the first aperture (associated with the feeder cable) extends completely through the mold and the second aperture (associated with the drop line cable) extends partially through the mold. However, in embodiments where, for example, two adjacent cables create joined pathways through the mold, whether the apertures still only extend “partially through” becomes less clear. *Decl.* ¶[597].

“Start at the Nexus Test”: this test relies on Patent Owner’s litigation position in the ITC’s evidentiary hearing and earlier Markman hearing. Under this test, any drop line cable that encounters a nexus (e.g., the area of electrical connection between two conductors) necessarily is terminated at the nexus and the aperture associated with that cable would also end at the same location. As applied to Figure 7, the second apertures would only extend partially through the [undermold / primary mold], as would every aperture associated with a drop line cable, regardless of any details associated with the actual orientation and arrangement of the cables entering and traversing the nexus. *Decl.* ¶[598].



“Effective Physical Pathway Test”: this test relies on a theory presented by counsel for Patent Owner during the *Markman* hearing in the ITC. *Decl.* ¶[599]. The test contemplates that when the cable associated with the drop line enters the compression lug and the lug is crimped, the cable is crushed and distorted in a way that makes it essentially disappear within the lug. In that regard, there would no longer be a physical pathway associated with the drop line cable or wire, and as a result, no aperture that could pass all the way through the lug. *Id.* An annotated version of Figure 7 is shown below:



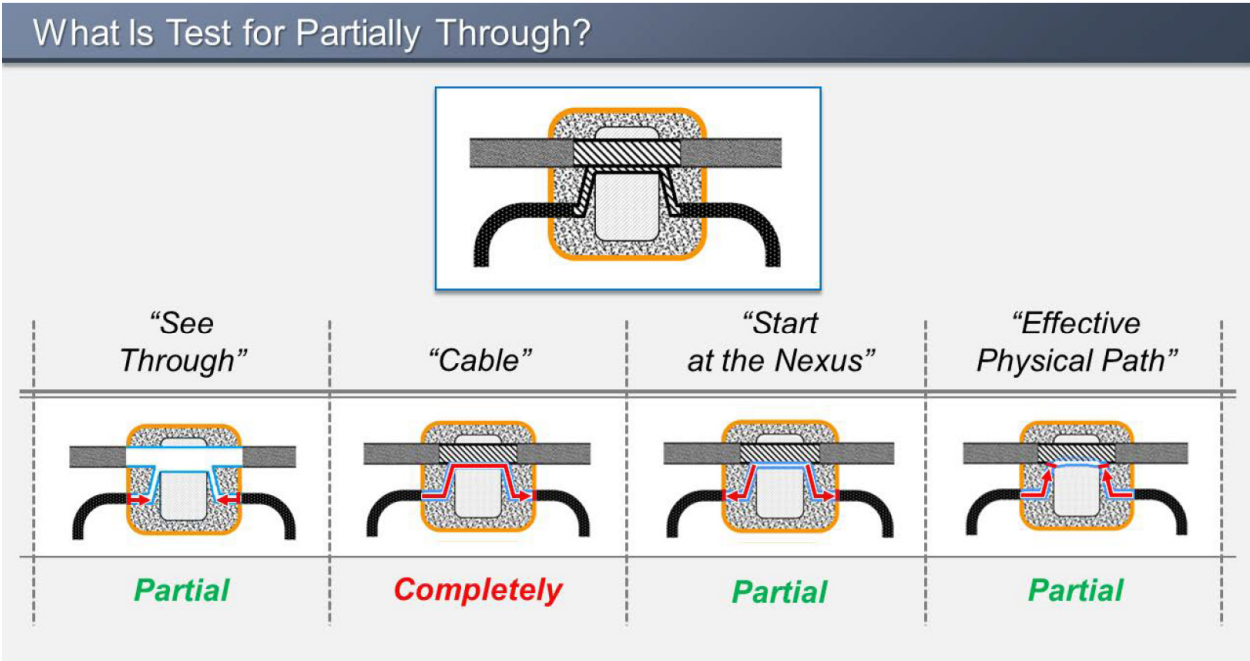
For each of the above tests, the second aperture associated with the drop line cable of figure 7 extends partially through the mold. However, when the tests are applied to mold structures involving multiple drop lines or branches, depending on whether the apertures are formed with a single cable or two cables, depending on whether there are bends within the mold, whether the aperture terminates or begins at the nexus, or whether the cable is crushed into the compression lug, the determination of whether the second aperture extends partially through will vary.

Decl. ¶[600].

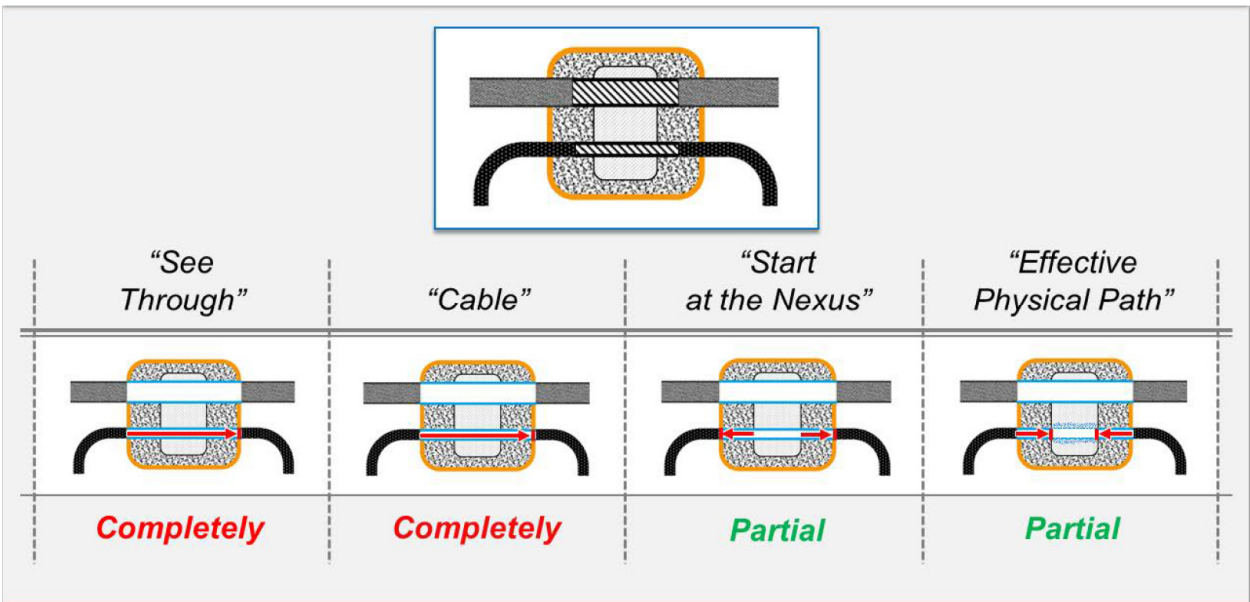
As shown in the demonstrative below applying tests #2 through #5, different tests for different configurations of drop line or branch cables reach different

results. Decl. ¶¶[601]-[605].

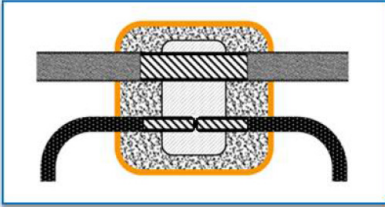
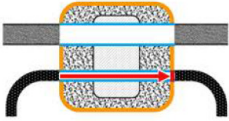
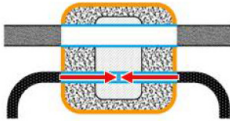
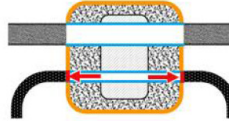
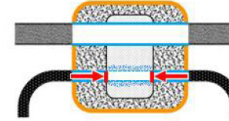
Structure 1:



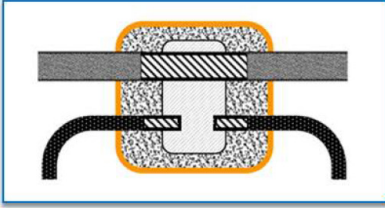
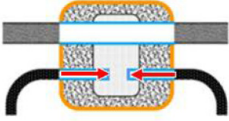
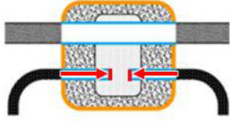
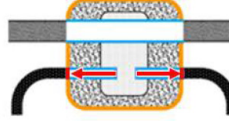
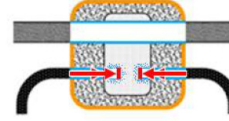
Structure 2:



Structure 3:

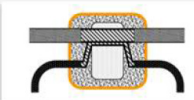
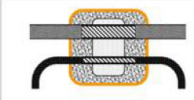
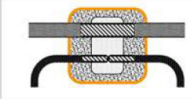
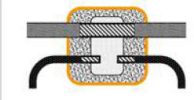
			
"See Through"	"Cable"	"Start at the Nexus"	"Effective Physical Path"
			
Completely	Partial	Partial	Partial

Structure 4:

			
"See Through"	"Cable"	"Start at the Nexus"	"Effective Physical Path"
			
Partial	Partial	Partial	Partial

To summarize the results of each of those four tests when looking at the four different potential exemplary mold structures based on the cable(s) forming apertures within, the chart below illustrates how without having reasonable certainty as to which test to apply, a POSITA cannot with reasonable certainty

understand the metes and bounds of the claims of the '153 Patent. Decl. ¶[606].

What Is Test for Partially Through?				
<u>NO REASONABLE CERTAINTY</u>				
	"See Through"	"Cable"	"Start at the Nexus"	"Effective Physical Path"
	Partial	Completely	Partial	Partial
	Completely	Completely	Partial	Partial
	Completely	Partial	Partial	Partial
	Partial	Partial	Partial	Partial

VI. 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. First, 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. Second, a trial date has not been set and fact discovery has not started. Third, the majority of the grounds presented in this petition were not presented at the evidentiary hearing in the ITC. The only grounds presented were invalidity based on Yamawaki and Shao and under 35

U.S.C. § 112. Petitioner has not asserted Solon741, Amphenol, and Tamura as prior art in the parallel ITC proceeding. Fourth, the parties are the same 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 Solon741, Amphenol, Shao, 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.

Grounds 1-3 assert Yamawaki as a secondary reference and Grounds 5-7 assert Yamawaki as the primary reference. Yamawaki was asserted by the Examiner as a primary reference. EX1002, pp.80-88,221-239. By amending to overcome the Final Rejection by accepting allowable subject matter, Applicant essentially admitted that Yamawaki taught those elements of the finally rejected claims as maintained in the Final Office Action. EX1002, pp.70. Instead, Applicant amended independent claims to recite feature of original claims 10 and

17 that the Examiner said were “allowable.”¹ Grounds 1-3 and 5-7 assert Yamawaki for disclosures of claim limitations that the Examiner found in Yamawaki and Applicant did not dispute. Further, Yamawaki is combined with Solon741, Amphenol, Shao, and Tamura, which were not cited in any of the office communications (individually or in combination). EX1002, pp.80-89,221-239. Additionally, Ground 5 is based on Amphenol, Shao, and Tamura.

Regarding *Becton* factors (a) (material differences between asserted art and prior art) and (b) (cumulative nature of the asserted art and prior art), Solon741, Amphenol, Shao, and Tamura are materially different from the references asserted in Office communications because these references disclose the element amended into the independent claims 1 and 16 by Applicant. Thus, they are not merely cumulative of references the Examiner relied on.

Regarding *Becton* factors (c) (evaluation of art during examination), none of Solon741, Amphenol, Shao, and Tamura were used in any claim rejections, weighing strongly against exercising discretion. *See Cellco Partnership v. Huawei Device Co.*, IPR2020-01117, Paper 10, 13 (Feb. 3, 2021) . Further, the Examiner’s

¹ The amendments added claim element 1(c)(iii) of a “third aperture,” even though Solon741 by the same inventor discloses this feature. *See* Ground 1 element 1(c)(iii).

findings of the disclosures of Yamawaki were not rebutted and therefore are applied in this petition as effectively admitted findings.

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 Solon741, Amphenol, Shao, and Tamura disclosures.

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 Solon741, Amphenol, Shao, and Tamura references during prosecution per *Becton* factor (e). These references could have been found (particularly Solon741) and, in the asserted combinations with Yamawaki, teach all ’153 claim limitations, particularly the “allowable” features of canceled claims 10 and 17 that formed the basis for allowance over Yamawaki.

VII. CONCLUSION

Post grant review of claims **1-24** of U.S. Patent No. 11,689,153 is requested based on the grounds described above.

Respectfully submitted,

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Date: March 27, 2024

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

The undersigned hereby certifies that the above-captioned **PETITION FOR POST GRANT REVIEW OF U.S. PATENT NO. 11,689,153**, Petitioner's power of attorney, and all associated exhibits were served in their entireties on March YY, 2024, on the following party via Express Mail:

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UNITED STATES


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

Attorney for Petitioner

Date: March 27, 2024

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CERTIFICATE OF COMPLIANCE WITH WORD COUNT LIMITATION

Pursuant to 37 C.F.R. § 42.24 *et seq.*, the undersigned attorney hereby certifies that this Petition complies with the 18,700-word type-volume limitation. This Petition contains **18,571** words according to the word-processing program used to prepare this document (Microsoft Word) plus words in imaged portions of the specification, excluding words in figures copied 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: March 27, 2024

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