

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MAXLITE, INC.,
Petitioner,

v.

JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD.,
Patent Owner.

IPR2020-00208
Patent 9,807,826 B2

Before BRYAN F. MOORE, BRIAN J. McNAMARA, and
JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

MaxLite, Inc. (“Petitioner”) filed a Petition requesting *inter partes* review (“IPR”) of claims 1, 7, and 12–18 (the “challenged claims”) of U.S. Patent No. 9,807,826 B2 (Ex. 1001, the “’826 patent”). Paper 1 (“Pet.”). Jiaying Super Lighting Electric Appliance Co., Ltd. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Petitioner filed an authorized Reply to the Preliminary Response regarding the priority date of the challenged patent. Paper 7. Patent Owner filed an authorized Sur-Reply to the Reply. Paper 9.

We denied the Petition and did not institute an *inter partes* review of any of the challenged claims. Paper 10. Petitioner filed a Request for Rehearing. Paper 11. We subsequently granted Petitioner’s Request for Rehearing and, thus, granted institution of an *inter partes* review of the challenged claims. Paper 14 (“Dec.” or “Decision”).

Patent Owner requested rehearing of our Decision to institute review. Paper 18. We denied Patent Owner’s request. Paper 32.

Patent Owner filed a Response to our Decision to institute. Paper 31 (“PO Resp.”). Petitioner filed a Reply. Paper 34 (“Reply”). Patent Owner filed a Sur-Reply. Paper 35 (“Sur-Reply”). An oral argument was held on March 2, 2022, and a transcript was entered into the record. Paper 39 (“Tr.”).

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1, 7, and 12–18 of the ’826 patent are unpatentable.

II. BACKGROUND

A. Related Proceedings

The parties identify the following pending district court proceeding involving the '826 patent: *Jiaxing Super Lighting Electric Appliance Co., Ltd. v. MaxLite, Inc.*, 2:19-cv-04047 (CD Cal.). Pet. 67; Paper 3, 2.

B. Real Parties-in-Interest

Petitioner identifies MaxLite, Inc. as a real party-in-interest. Petitioner identifies CH Lighting Technology Co., Ltd., as “potentially” a real party-in-interest. Pet. 66. Patent Owner identifies Jiaxing Super Lighting Electric Appliance Co., Ltd., Obert, Inc., and Zhejiang Super Lighting Electric Appliance Co. Ltd. as the real parties-in-interest. Paper 3, 2.

C. The '826 Patent (Ex. 1001)

The '826 patent is drawn to “illumination devices, and more particularly to an LED tube lamp and its components including the light sources, electronic components, and end caps.” Ex. 1001, 1:50–54. According to the '826 patent, the tube lamp of the invention comprises “a first rectifying circuit, a second rectifying circuit, an LED lighting module, a mode determination circuit and a mode switching circuit.” *Id.* at 3:8–11.

D. Illustrative Claim

The '826 patent has eighteen claims of which claim 1 is the sole independent claim. Nine claims (1, 7, and 12–18) are challenged in the Petition. *See supra*. Claim 1 recites:

1. [pre] An LED tube lamp, comprising:
[a] a first rectifying circuit, coupled to a first pin and a second pin and configured to rectify an external driving signal transmitted from the first pin and/or the second pin;

[b] a second rectifying circuit coupled to a third pin and a fourth pin and configured to rectify the external driving signal with the first rectifying circuit;

[c] a filter circuit, coupled to the first rectifying circuit and configured to filter the rectified signal;

[d] an LED lighting module, having a driving circuit and an LED module, and coupled to the filter circuit and connected to receive the filtered signal;

[e] a mode determination circuit, configured to generate a first determined result signal based on the external driving signal; and

[f] a mode switching circuit, coupled to the filter circuit and the driving circuit, configured to determine whether to perform a first driving mode or a second driving mode based on the first determined result signal,

[g] wherein the driving circuit is configured to receive a filtered signal from the filtering circuit and drive the LED module to emit light when performing the first driving mode, and the filtered signal bypasses at least a component of the driving circuit to drive the LED module to emit light when performing the second driving mode.

Ex. 1001, 72:64–73:21 (formatting and bracketed material added).

E. References and Other Evidence

The Petition relies on the following reference: CN 204442771U, filed Feb. 10, 2015, published July 1, 2015 (Ex. 1004, with corresponding English translation Ex. 1003, “Duan”). In addition, Petitioner submits the Declaration of Regan Zane, Ph.D. (Ex. 1002, “Zane Decl.”).

F. Asserted Ground of Unpatentability

Petitioner asserts the challenged claims are unpatentable on the following ground.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 7, and 12–18	102(a)(1)	Duan

Pet. 2.

III. PRELIMINARY MATTERS

A. Level of Ordinary Skill

Petitioner contends that a person of ordinary skill in the art at the time of the invention would have had

a B.S. degree in electrical engineering, or an equivalent field, as well as at least 2-4 years of academic or industry experience in lighting design, including knowledge of LEDs and related technology for driving LEDs. A person of ordinary skill in the art with a higher level of education may have fewer years of academic or industry experience, or vice versa.

Pet. 22 (citing Ex. 1002 ¶ 10). Patent Owner does not contest Petitioner’s articulation of the level of skill in the art. PO Resp. 4–5. We regard Petitioner’s definition as consistent with the prior art before us. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself may reflect an appropriate level of skill). Thus, we adopt Petitioner’s proposal.

B. Claim Construction

We interpret claim terms using “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). In this context, claim terms “are generally given their ordinary and customary meaning” as understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v.*

AWH Corp., 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Extrinsic evidence is “less significant than the intrinsic record in determining ‘the legally operative meaning of claim language.’” *Phillips*, 415 F.3d at 1317.

Patent Owner asserts the claim term “first driving mode” should be construed to mean “a low frequency external driving signal supplied to the LED tube lamp in a double-ended configuration.” PO Resp. 6.

Patent Owner relies on the specification, which recites “when the **lamp driving circuit 505 is not present** and the LED tube lamp 500 is **directly supplied by the AC power supply 508**, the mode switching circuit may determine to perform a first driving mode” *Id.* (citing Ex. 1001, 51:1–4). Patent Owner further asserts

when the lamp driving circuit 505 (a.k.a. ‘ballast’) is not present, the LED tube lamp 500 directly receives AC [Alternating Current] power from power supply 508. This AC power operates as a low frequency signal through pins 501 and 502 at both ends of the LED tube lamp 500, in other words in a double-ended configuration.

Id. at 6–7. Finally, Patent Owner asserts “the ’826 Patent repeatedly defines the ‘first driving mode’ as operating in the low frequency mode,” for example, Patent Owner relies on the following from the Specification: “[w]hen the external driving signal is a signal with a low frequency and low voltage, the determined result signal S580 is at a low voltage level to make

the mode switching circuit determine to operate at the *first driving mode*.” *Id.* at 7 (quoting Ex. 1001, 51:41–45) (alteration in original).

Although the specification may have *an* embodiment or *all* embodiments that operate with a low frequency driving signal in a double-ended configuration, Patent Owner did not recite “low frequency” or “double-ended” in its claims and instead chose the broader term “first driving mode.” *See In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004) (“We have cautioned against reading limitations into a claim from the preferred embodiment described in the specification, even if it is the only embodiment described, absent clear disclaimer in the specification.”). The fact that a limitation in the specification may define over the prior art does not justify importing that limitation into the claims unless a term is expressly defined such that the patentee becomes his own lexicographer or there is an express disavowal of claim scope. *See GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1308–09 (Fed. Cir. 2014).

There is no evidence of an express disavowal here. As to lexicography, we disagree with Patent Owner’s contention that the Specification defines the phrase “first driving mode.” Patent Owner relies on the mere fact that the specification describes an embodiment with a first driving mode that has a low frequency driving signal and is in a “double-ended” configuration, but this is not sufficient to define the term. The specification does not require that a low frequency driving signal must necessarily be used. In fact the specification, although not entirely clear, suggests that the driving signal may be from a high frequency ballast. Ex. 1001, 51:8–14. Thus, the fact that the patent here discloses a low frequency

driving signal does not mean that all the claims are directed to such a driving signal. *See E-Pass Tech., Inc. v. 3Com Corp.*, 343 F.3d 1364, 1368–69 (Fed. Cir. 2003). Indeed, dependent claim 15 recites “the first driving mode is performed when the external driving signal is a relatively low frequency or voltage signal,” while the independent claims were directed to a more general driving signal. The doctrine of claim differentiation suggests that the independent claims here should not include explicit limitations of a dependent claim. *See Phillips*, 415 F.3d at 1315 (“[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.”); *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004).

Petitioner also argues that Figure 36A shows a configuration in which pins 501 and 502 are on the same end of the LED lamp tube suggesting a single-ended configuration. Reply 4–5. Patent Owner does not explain why this configuration would not read on the claims.

Thus, for the reasons above, we decline to construe the term “first driving mode” to mean “a low frequency external driving signal supplied to the LED tube lamp in a double-ended configuration.”

We also see no need to construe any other terms for the purposes of this Decision. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (explaining that only claim terms in controversy need to be construed, and only to the extent necessary to resolve the controversy).

C. Duan (Ex. 1004, Ex. 1003 (English Translation))

Petitioner’s challenge relies only on Duan as an anticipating reference. *See* Pet. 2. Duan is a patent titled “Safety Switch Device, General Type

Light-Emitting Diode Lamp Tube and Power Supply System Thereof.” Ex. 1003, code (54). Duan discloses a “light-emitting diode (LED) lamp tube having a safety switch mechanism and a power supply system thereof, and in particular . . . a safety switch device, a general type LED light tube and a power supply system thereof.” *Id.* ¶ 1.

D. Purported Effective Filing Date for the '826 Patent

Patent Owner contends that Duan is not prior art because the '826 patent is entitled to an effective filing date that predates Duan's publication (July 1, 2015). PO Resp. 77–78. Specifically, to establish an effective filing date of at least June 10, 2015, for challenged independent claim 1¹ of the '826 patent, Patent Owner relies on application CN 2015-1-0315636 (the “'636 Chinese Application”, Ex. 2001), filed on June 10, 2015 and application CN 2015-1-0134586.5 (the “'586 Application”, Ex. 2007), filed on March 26, 2015, as providing written description support. PO Resp. 12 (citing Ex. 2002, 1; Ex. 2001 [English Translation]), 45 (citing Ex. 2007, 1; Ex. 2006 [English Translation]).

After several rounds of briefing and a rehearing motion from each side, we instituted this IPR because we determined that in the pre-institution briefing “Patent Owner [did] not provide[] support to show that each of the limitations of the challenged claims of the '826 patent are supported by the '636 Chinese Application” (Dec. 8) and “Patent Owner [did] not explain sufficiently or point to sufficient evidence in the record that the '636

¹ Patent Owner also addresses dependent claims 12 and 14 but because we determine Patent Owner has failed to show written description support for claim 1 we do not address claims 12 and 14.

Chinese Application was filed on behalf of the named inventors of the '826 patent" (*id.* at 11). Post-institution Patent Owner has presented a full analysis of the priority support for independent claim 1. In *Dynamic Drinkware*, the Federal Circuit stated that in an *inter partes* review there are two distinct burdens of proof: the burden of persuasion and the burden of production. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)). The burden of persuasion is described as follows:

The burden of persuasion "is the ultimate burden assigned to a party who must prove something to a specified degree of certainty," such as by a preponderance of the evidence or by clear and convincing evidence . . . In an *inter partes* review, the burden of persuasion is on the petitioner to prove "unpatentability by a preponderance of the evidence," 35 U.S.C. § 316(e), and that burden never shifts to the patentee. "Failure to prove the matter as required by the applicable standard means that the party with the burden of persuasion loses on that point—thus, if the fact trier of the issue is left uncertain, the party with the burden loses."

Id. at 1378–79.

With respect to entitlement to earlier effective filing dates, a patent owner "is not presumed to be entitled to the earlier filing dates of ancestral applications which do not share the same disclosure." *Lupin Ltd. v. Pozen, Inc.*, IPR2015-01775, Paper 15 at 10–11 (PTAB March 1, 2016) (citing *Focal Therapeutics, Inc. v. SenoRx, Inc.*, IPR2014-00116, Paper 8 at 9 (PTAB April 22, 2014); *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1305–06 (Fed. Cir. 2008)); *see also Franklin Electric Co. v. Liberty Pumps, Inc.*, IPR2017-00113, Paper 14 at 12–13 (PTAB April 27, 2017).

We determine that Petitioner has sufficiently raised the issue of whether Patent Owner is entitled to the priority of the '636 Chinese Application by relying on Duan, which has an earlier filing date than the '826 patent. *See Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316 (Fed. Cir. 2008). For example, the *Tech. Licensing* court found that, after the party asserting prior art—analogue to the petitioner in an IPR—established a prior art date before the filing date of the challenged patent, the burden of production shifts to the patent owner to show the challenged patent has an earlier date. *Id.* at 1327.

Thus, as to the burden of production, the patent owner “has the [production] burden of going forward with evidence . . . that the prior art . . . is not prior art because the asserted claim is entitled to the benefit of a filing date prior to the alleged prior art.” *Id.* at 1327. The *Tech. Licensing* court then found that the patent owner was required

to show not only the existence of the earlier application, but why the written description in the earlier application supports the claim . . . that means producing sufficient evidence and argument to show that an *ancestor* to the [challenged patent], with a filing date prior to the [date of the asserted prior art], contains a written description that *supports all the limitations* of [the challenged claims].

Id. Patent Owner is required to make this showing here in order to satisfy its burden of production regarding its argument that the '826 patent is entitled to an effective filing date before Duan.

We determine that Patent Owner has not shown sufficiently that the Chinese priority patent applications it relies on—the '636 Chinese Application and the '586 Application—provide written description support for the limitation of “a mode determination circuit, configured to generate a

first determined result signal based on the external driving signal” and “a mode switching circuit, coupled to the filter circuit and the driving circuit, configured to determine whether to perform a first driving mode or a second driving mode based on the first determined result signal,” recited in claim 1. PO Resp. 31–34, 60–67. Specifically, Patent Owner relies on structures in the ’636 Chinese Application and the ’586 Application that are not sufficiently similar to structures in the ’826 patent i.e., DR Circuit 140, excluding diodes D5 and D6, as shown in Figs. 24i–j and 29b. *Id.* at 27 (citing Ex. 2001, 23–24, 29, and 33, Fig. 24i–j and 29b).

Patent Owner’s argument and the Figures and disclosures it relies on in the ’636 Chinese Application and the ’586 Application are essentially the same. For brevity, we discuss the ’636 Chinese Application, but this discussion also applies to ’586 Application. Patent Owner asserts “Fig. 24i [] of the ’636 Application depicts a DR Circuit 140 having a mode determination circuit that is attached to a Switching Circuit 150 containing a

switch SW.” *Id.* at 28 (citing Ex. 2001, 32, Figs. 24i–j, 29b). One of Patent Owner’s annotated Fig. 24i is reproduced below.

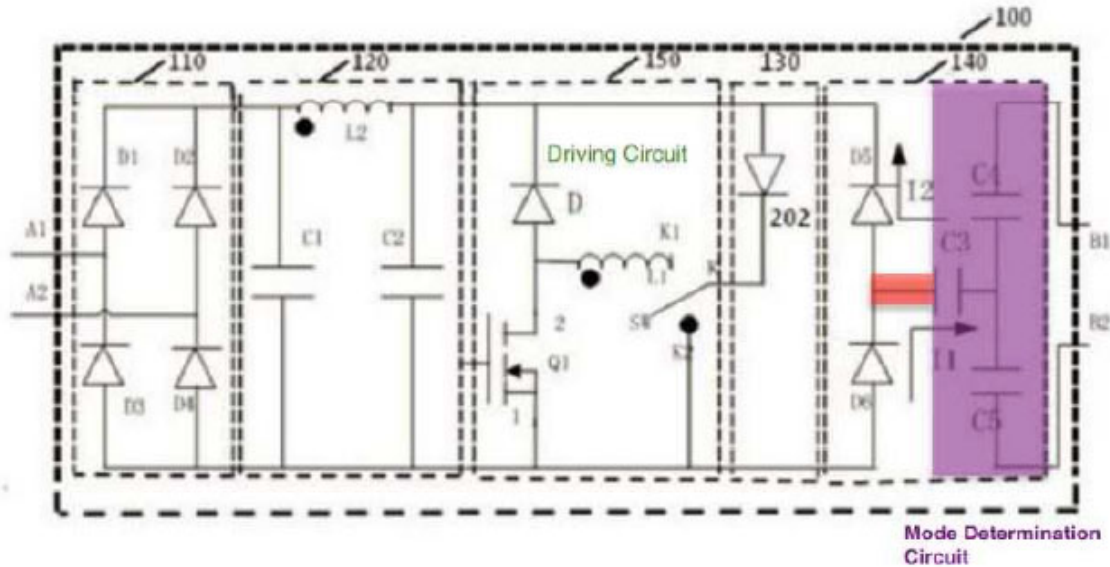


Fig. 24i

Patent Owner’s annotated Figure 24i, above, shows a circuit 100 including sub-circuits 110, 120, 150, 130 and DR circuit 140, a portion of which (including capacitors C3, C4, and C5) is shaded in purple with a label indicating that this is what Patent Owner relies on as the “mode determination circuit.” *Id.* Also, highlighted in red is what Petitioner relies on for the “first determined result signal.” *Id.* at 31.

Another one of Patent Owner’s annotated Fig. 24i is reproduced below.

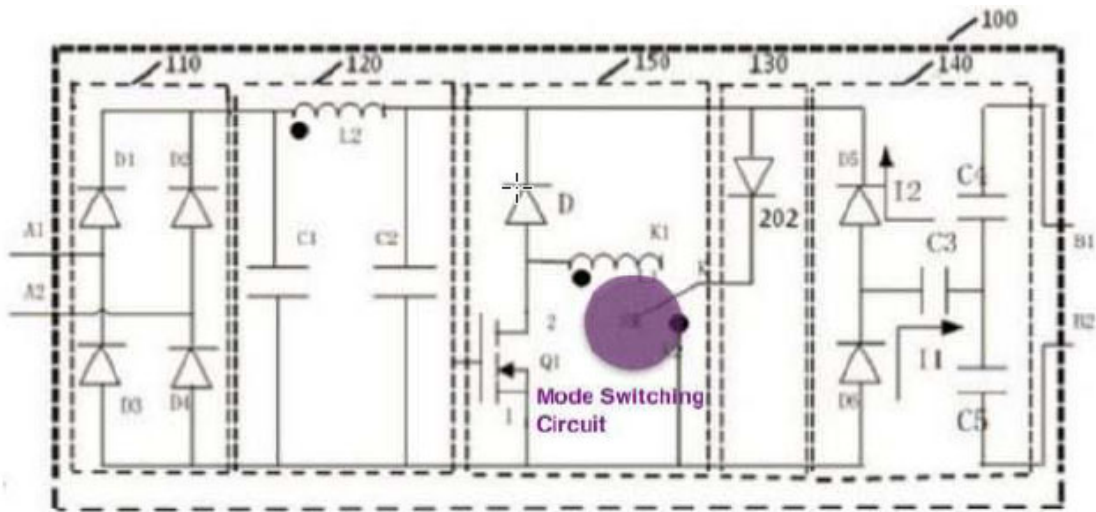


Fig. 24i

Patent Owner’s annotated Figure 24i, above, shows a circuit 100 including sub-circuits 110, 120, 140, 130 and sub-circuit 150, a portion of which (including switch SW) is shaded in purple with a label indicating that this is what Patent Owner relies on as the “mode switching circuit.” *Id.* at 32.

Patent Owner asserts that

the ’636 Application’s DR Circuit 140 (excluding diodes D5 and D6) detects the frequency of an input external driving signal based on the source and state of the external driving signal. Where the external driving signal is a high-frequency AC signal (especially from a ballast) that is input in a double-ended configuration and powers the LED tube lamp, the DR Circuit 140 (excluding diodes D5 and D6) causes the LED tube lamp to operate to emit light by a current flowing through and between one end of either first pin A1 or second pin A2 and the other end of either third pin B1 or fourth pin B2. Where the external driving signal is a low-frequency AC driving signal (especially from an AC power main or line power) that is input in a single-ended configuration and powers the LED tube lamp, and the switching circuit SW switches to connect to contact K1, the DR

Circuit 140 (excluding diodes D5 and D6) causes the LED tube lamp to operate to emit light by a current flowing through and between one end of first pin A1 and second pin A2.

Id. at 30. In other words, according to Patent Owner, the '636 Chinese Application discloses a circuit that senses and determines if the external power source is a high-frequency or low-frequency signal. Patent Owner also contends that this circuit generates the “first determined result signal,” as the claim requires (*id.* at 30–31), and as noted above, Patent Owner contends that the switching circuit (SW) teaches the claimed “mode switching circuit” (*id.* at 32). However, the claim further recites that the “mode switching circuit . . . configured to determine whether to perform a first driving mode or a second driving mode *based on the first determined result signal*,” and Patent Owner fails to demonstrate the '636 Chinese Application discloses this aspect of the claim. In particular, Patent Owner does not identify any portion of the document that discusses *how* or *why* the switching circuit SW switches modes, and thus, Patent Owner does not show a disclosure of the mode switching circuit being configured to determine whether to perform a first or second mode based on a signal generated by the “mode determination circuit” (i.e., DR Circuit 140, excluding diodes D5 and D6), as required by the claim.

Patent Owner further asserts

[t]he first determined result signal is based on the source and state of the external driving signal, e.g., whether it is directly from an AC power main and input/received in a single-ended configuration, such as at pins A1/A2 or whether it is of a relatively high frequency from a ballast and input/received in a double-ended configuration, such as at pins A1/A2 and B1/B2.

Id. at 31 (citing Ex. 2001, 32–36, Figs. 24i–j, 28a–d, and 29a–b). Again, Patent Owner does not show that the “first determined result signal” affects the operation of the switching circuit SW.

Patent Owner also asserts

[t]he determination of whether to perform a first driving mode or a second driving mode is based on the first determined result signal . . . Based on this first determined result signal, the Switching Circuit SW selectively connects terminal K to either contact K1, in which a first driving mode will be performed or to contact K2, in which a second driving mode will be performed.

Id. at 34 (citing Ex. 2001, 34–35, Figs. 24i–j, 28a–d, and 29a–b). Again, Patent Owner does not show that the “first determined result signal” affects the operation of the switching circuit SW. Specifically, none of cited passages discloses that the switching circuit SW is configured to determine whether to perform a first or second mode based on a signal generated by another portion of the circuit, as required by the claim.

Finally, in its Sur-Reply Patent Owner asserts “[b]ased on the schematics in FIGS. 24i–j, 29b and accompanying description, it would have been understood that said determined result signal reaches switching circuit SW.” Sur-Reply 13, *see also id.* at 4–14 (purporting to describe how the ’636 Chinese Application meets the “mode determination circuit” and “mode switching circuit” limitations).² Nevertheless, we cannot discern

² Patent Owner also cites to “detection circuit 170” in its Sur-Reply and in its Preliminary Response at pages 10–12. Prelim. Resp. 10–12; Sur-Reply 5. We determined that Patent Owner waived any argument based on “detection circuit 170” by failing to raise that argument in its Patent Owner Response. Paper 37. Patent Owner did not request rehearing of that decision. We do not change that decision here. The only reference to “detection circuit 170”

from Patent Owner's argument or the cited pages and Figures from the '636 Chinese Application (Ex. 2001) that the "first determined result signal" affects the operation of the switching circuit SW.³ As Petitioner argues "the Chinese Applications explain only what happens when the switching circuit SW is switched to connect to K1 or K2, and that the switching circuit can be switched by external wire." Reply 11.

When asked at the oral hearing to explain how the "first determined result signal" causes the switching circuit SW to operate, Patent Owner's Counsel asserted "[a]s I mentioned, how that first determined result signal,

in the post institution record is at page 42 of Ex. 2001 which is cited by Patent Owner only to show

[w]here the external driving signal is a low-frequency AC driving signal (especially from an AC power main or line power) that is input in a single-ended configuration and powers the LED tube lamp, and the switching circuit SW switches to connect to contact K1, the DR Circuit 140 (excluding diodes D5 and D6) causes the LED tube lamp to operate to emit light by a current flowing through and between one end of first pin A1 and second pin A2.

PO Resp. 30 n.61. This does not give Petitioner sufficient notice that Patent Owner intended to rely on "detection circuit 170." It is a long-standing practice in IPR proceedings that arguments not raised in the Patent Owner Response are waived. *See* Paper 16 (Scheduling Order), 8 ("Patent Owner is cautioned that any arguments not raised in the response may be deemed waived."); *see also In re NuVasive, Inc.*, 842 F.3d 1376, 1380–81 (Fed. Cir. 2016) (finding that party waived arguments before PTAB by not timely raising them during trial phase) Additionally, "[a] sur-reply may only respond to arguments raised in the corresponding reply" 37 C.F.R. § 42.23(b).

³ This is true whether or not we consider Patent Owner's references in the Sur-Reply to "detection circuit 170."

the mechanics of how it makes it switch, you have to -- you know, the panel will have to make that determination based on the record before you and the evidence before you.” Tr. 47:1–5. Thus, Patent Owner did not provide further explanation on this issue at the hearing.

For the reasons above, Patent Owner has not established that claim 1 of the ’826 patent is entitled to the effective filing date of the ’636 Chinese Application (i.e., June 10, 2015) or the ’586 Application (i.e., March 26, 2015). Because the remaining asserted claims are dependent claims, Patent Owner has also not established that claims 7 and 12–18 of the ’826 patent are entitled to the effective filing date of the ’636 Chinese Application or the ’586 Application. The application that led to the ’826 patent was filed on March 25, 2016. The ’826 patent claims it is a continuation-in-part of application No. 15/055,630 (“the ’630 Application”), filed on February 28, 2016. So, even if the challenged claims were entitled to the earlier February 28, 2016 filing date, Duan issued on July 1, 2015, and is, thus, prior art to the challenged claims of the ’826 patent under 35 U.S.C. § 102(a)(1).

IV. ANALYSIS

A. Challenge to Claims 1, 7, and 12–18 Based on Duan

Petitioner contends claims 1, 7, and 12–18 are anticipated by Duan. Pet. 22–66. Petitioner supports this assertion with testimony from its declarant, Dr. Zane. Ex. 1002 ¶¶ 88–208.

1. Analysis

Petitioner’s element-by-element analysis of independent claim 1 in relation to Duan appears at pages 22–49 of the Petition. Petitioner supports its analysis with testimony from Dr. Zane. Ex. 1002 ¶¶ 88–145.

a. Independent claim 1

i. Preamble [pre]

“An LED tube lamp, comprising”

Petitioner contends that Duan discloses an LED tube lamp, as recited in the preamble of claim 1. Pet. 22–24. Petitioner relies upon Duan’s disclosure of “light-emitting diode (LED) lamp tube.” *Id.* (citing Ex. 1003 ¶¶ 1, 3, 6, 21, 22, 25, 29, 50; Ex. 1002 ¶¶ 89–91).

We have reviewed the record, and find that Petitioner shows that the prior art teaches the preamble of claim 1.⁴ Patent Owner makes no arguments contesting the prior art teachings of the preamble. *See generally* PO Resp.

ii. Limitation [a]

“a first rectifying circuit, coupled to a first pin and a second pin and configured to rectify an external driving signal transmitted from the first pin and/or the second pin”

Petitioner contends that limitation [a] of claim 1 is taught by Duan’s disclosure of rectifying filter circuit 32, the rectifying circuit in Figure 16, CON1, and CON2. Pet. 24–27 (citing Ex. 1003 ¶¶ 25, 29, 53, 62, Figs 7, 16; Ex. 1002 ¶¶ 61, 64, 93–99).

We have reviewed the record, and find that Petitioner shows that Duan teaches limitation [a] of claim 1. Patent Owner makes no arguments contesting the prior art teachings of this claim limitation. *See generally* PO Resp.

⁴ We need not determine whether the preamble of claim 1 is limiting because Petitioner has shown Duan discloses the preamble. *See Nidec*, 868 F.3d at 1017.

iii. Limitation [b]

“a second rectifying circuit coupled to a third pin and a fourth pin and configured to rectify the external driving signal with the first rectifying circuit”

Petitioner contends that limitation [b] of claim 1 is taught by Duan’s disclosure of full bridge conversion unit 112, the rectifying circuit in Figure 16, CON3, and CON4. Pet. 27–31 (citing Ex. 1003 ¶¶ 25, 29, 34, 44, 62, Figs. 3, 11, 16; Ex. 1002 ¶¶ 61, 100–106).

Patent Owner argues “Petitioner fails to establish that Duan discloses a second rectifying circuit that rectifies the external driving signal *with* the first rectifying circuit . . . Petitioner simply makes a conclusory assertion that the second rectifying circuit rectifies with the first rectifying circuit.” PO Resp. 79. Patent Owner further asserts “Duan does not provide any description for Fig. 16, including the claimed second rectifying circuit ... configured to rectify the external driving signal *with* the first rectifying circuit beyond the cursory and generic description that Fig. 16 is ‘a detailed circuit diagram of the general type LED light tube according to the present utility mode.’” *Id.* at 79–80 (citing Ex. 1003 ¶¶ 24–25, 27, 29, 30–33, 35, and 37–43) (alteration in original). We cannot discern what Patent Owner asserts is missing from Petitioner’s contention regarding the term “with.” To the extent that Patent Owner asserts there is insufficient explanation in the Duan specification of how the second rectifying circuit is configured to rectify the external driving signal with the first rectifying circuit, because Petitioner relies essentially on a Figure, we look to Figure 16 itself and credit Dr. Zane’s detailed explanation of how the first and second rectifier

work to rectify the signal.⁵ See Ex. 1002 ¶¶ 84, 105; *c.f. Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991) (earlier-filed design drawings support later-filed utility claims reciting certain dimensions).

We have reviewed the record, and find that Petitioner shows that Duan teaches limitation [b] of claim 1.

iv. Limitation [c]

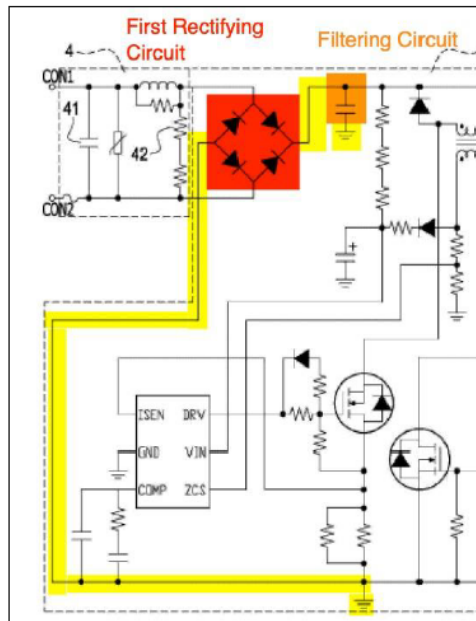
“a filter circuit, coupled to the first rectifying circuit and configured to filter the rectified signal”

Petitioner contends that Duan discloses limitation [c] of claim 1 by its disclosure of rectifier filtering circuit 32 and a capacitor in Figure 16. Pet. 31–33 (citing Ex. 1003 ¶ 53, Figs. 3, 16; Ex. 1002 ¶¶ 107–112). Petitioner’s annotated portion of Figure 16, reproduced below, illustrates the location of the capacitor.

⁵ The courts have long supported the proposition that figures alone can support a finding of anticipation:

We know of no rule that figures can never of themselves be an adequate anticipation of mechanical inventions, as of course they must be of designs, and we can see no reason for importing into the statute an arbitrary distinction, unrelated to its purposes Words have their equivocations quite as much as figures; the question always must be what the art necessarily gathered from what appeared.

Jockmus v. Leviton, 28 F.2d 812, 814 (2d Cir. 1928) (L. Hand, J.) (citations omitted).



Petitioner’s annotated portion of Figure 16, reproduced above, illustrates the location of the alleged filtering capacitor (orange) and the circuit path (yellow) to the alleged first rectifying circuit (red).

Patent Owner argues Petitioner does not explain how a capacitor in Figure 16 is the “filtering circuit” and how it is to be combined with Figure 7. PO Resp. 80–82. Patent Owner also offers attorney argument that “Petitioner provides no explanation for how this capacitor performs any filtering, much less filtering of a rectified signal.” *Id.* at 81. Nevertheless, Petitioner’s declarant asserts “A POSITA at the time of the purported invention of the ‘826 patent would have understood that the purpose of a filtering capacitor such as the one disclosed in Duan is to filter a rectified signal” and that “Duan describes the first rectifying circuit and the filtering capacitor together as a ‘rectifier filter circuit.’” Ex. 1002 ¶ 109 (citing Ex. 1003 ¶ 53); *see also* ¶¶ 107–112 (explaining the signal path through the capacitor). Patent Owner does not explain sufficiently why the declarant’s

statement about the knowledge of one of ordinary skill is incorrect or why the circuit called the “rectifier filter circuit” would not perform filtering.

Patent Owner also argues that Petitioner’s declarant “admits that it is possible to have a filter that does not use a capacitor.” PO Resp. 81. Nevertheless, the issue is not whether there is some other way to do filtering but whether Duan’s capacitor performs the filtering recited in the claim. Thus, we are not persuaded by Patent Owner’s argument.

Patent Owner asserts “Petitioner’s anticipation case hinges on Fig. 16 of Duan – it is the centerpiece of Petitioner’s case and is used in Petitioner’s analysis for every limitation of every claim. Yet Duan does not provide any description for Fig. 16” *Id.* at 79 (footnote omitted). For example, Patent Owner suggests that Figure 7 cannot be combined with Figure 16. *Id.* at 82. Although we agree that Duan has no description of Figure 16 beyond stating—Figure 16 is “a detailed circuit diagram of the general type LED light tube according to the present utility model” (Ex. 1003 ¶ 24)—we disagree that Figure 16 is improperly combined with Figures 3 and 7–11, as explained below.

For a prior art reference to anticipate a claim, it must disclose all of the limitations of the claim, “arranged or combined in the same way as in the claim.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008). For example, in *Net MoneyIN*, the Federal Circuit held that an “Internet payment system” was not anticipated by a prior art reference that disclosed all the components of the invention, because the reference disclosed two separate payment protocols, each of which contained only a subset of the components claimed in the patent at issue. *Id.* at 1371. “[T]he [prior art] reference must clearly and unequivocally disclose the claimed

[invention] or direct those skilled in the art to the [invention] without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” *Id.* (alterations in original).

Nevertheless, the Federal Circuit has also held that “a reference can anticipate a claim even if it ‘d[oes] not expressly spell out’ all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would ‘at once envisage’ the claimed arrangement or combination.” *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1341 (Fed. Cir. 2016) (alteration in original); *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015).

In explaining the combination of Figures, Petitioner contends that Figure 16 replaces the blocks shown in Figures 7–9 with actual circuit components. Pet. 19. Petitioner also contends that “[b]y combining the information of Figures 8, 9 and 16, the current flow through Figure 16 is readily apparent.” *Id.* at 20 (footnote omitted).

We also credit Petitioner’s declarant who testifies that in applying Figure 7 to Figure 16 “a POSITA would easily be able to determine the current path.” Ex. 1002 ¶ 77. Additionally, we credit Dr. Zane’s testimony that “Duan Figure 16 is a full circuit diagram of an LED light tube according to Duan, that includes all three of Duan’s improvements over conventional LED light tubes: the safety switch device (item 1), the power supply conversion device, which includes the driving circuit in combination with the frequency selecting circuit (item 3), and the virtual filament circuit (item 4).” *Id.* ¶ 60. In fact, the item numbers in Figure 16 correspond to the item numbers in Figure 6–10 and 15 suggesting that the embodiments in those

figures correspond to the embodiment in Figure 16. *See generally* Ex. 1003; *see also* Ex. 1002 ¶ 60 (explaining the significance of the item numbers).

Dr. Zane also testifies that “the full wave rectifier of Figure 16 functions in the same way as the full wave rectifiers in Figures 3, 4, and 5” (Ex. 1002 ¶ 83) and “Figures 3, 4 and 5 all depict different embodiments of the safety switch device of Duan,” (*id.* ¶ 82) which is also shown in Figure 16. Thus, Petitioner’s anticipation position does not appear to require combining distinct embodiments to arrive at the claimed subject matter; rather, it is that other description and figures in Duan help explain how the skilled artisan would understand Duan’s Figure 16.

As for limitation [c] of claim 1, Patent Owner asserts

Petitioner attempts to incorporate Fig. 7’s disclosure of a rectifier filter circuit 32 into Fig. 16. But Petitioner provides no indication that the capacitor Petitioner highlighted in Fig. 16 is a part of a rectifier filter circuit. In fact, Duan does not disclose that Fig. 7’s rectifier filter circuit 32 is also depicted in Fig. 16. Even Dr. Zane admits that paragraphs 53 and 54 of Duan, which discusses the rectifier filter circuit 32 do not cite to Fig. 16 (‘Q: Paragraphs 53 and 54 do not cite to Figure 16, right? A: That is correct. Paragraphs 53 and 54 do not cite to Figure 16.’)

PO Resp. 82 (citing Ex. 2008, 18). Nevertheless, Petitioner also provides testimony that “POSITA would understand that the rectifier filter circuit 32 in Figure 7 corresponds to the full bridge rectifier and capacitor filter circuit of Figure 16.” Ex. 1002 ¶ 64. Petitioner also shows that “Duan describes the first rectifying circuit and the filtering capacitor together as a ‘rectifier filter circuit.’” Ex. 1002 ¶ 109 (citing Ex. 1003 ¶ 53). We credit the testimony of Petitioner’s declarant. Thus, we are not persuaded by this argument by Patent Owner.

We determine that Petitioner has explained sufficiently that Figures 7 and 16 are compatible embodiments such that they teach the limitations of claim 1 arranged in the same way as the '826 patent without the need to pick and choose disparate disclosures.

Patent Owner also suggests that Petitioner relies on inherency. PO Resp. 83. We do not discern that Petitioner has relied on inherency but rather it relies on its declarant's explanation of how the circuit would be understood by one of ordinary skill in the art. "[T]he dispositive question regarding anticipation[, therefore, i]s whether *one skilled in the art* would reasonably understand or infer from the [prior art reference's] teaching' that every claim element was disclosed in that single reference." *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368–69 (Fed. Cir. 2003) (alterations in original) (quoting *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991)).

We have reviewed the record, and find that Petitioner shows that Duan teaches limitation [c] of claim 1.

v. Limitation [d]

“an LED lighting module, having a driving circuit and an LED module, and coupled to the filter circuit and connected to receive the filtered signal”

Petitioner asserts that Duan discloses limitation [d] of claim 1 by Duan's disclosure of DC to DC conversion circuit 34, and LED light strip 2. Pet. 33–36 (citing Ex. 1003 ¶ 53, Fig. 16; Ex. 1002 ¶¶ 113–121). Specifically, Duan recites the DC to DC conversion circuit 34 “is connected to the rectifier filtering circuit 32 and converts this rectified and filtered power supply to output a driving power supply and then to drive the LED light strip 2.” *Id.* at 36 (quoting Ex. 1003 ¶ 53).

We have reviewed the record and find that Petitioner shows that Duan discloses limitation [d]. Patent Owner makes no arguments contesting the prior art teachings of this claim limitation. *See generally* PO Resp.

vi. Limitation [e]

“a mode determination circuit, configured to generate a first determined result signal based on the external driving signal”

Petitioner contends that Duan teaches limitation [e] of claim 1 by its disclosure of “frequency selecting circuit 36,” which performs an “on operation” when the external power supply “is a high-frequency power supply” and an “off operation” when the external power supply “is a low-frequency power supply.” Pet. 36–38 (citing Ex. 1003 ¶¶ 58, 61, Figs. 10, 16; Ex. 1002 ¶¶ 122–125).

We have reviewed the record, and find that Petitioner shows that Duan discloses limitation [e] of claim 1. Patent Owner makes no arguments contesting the prior art teachings of this claim limitation. *See generally* PO Resp.

vii. Limitation [f]

“a mode switching circuit, coupled to the filter circuit and the driving circuit, configured to determine whether to perform a first driving mode or a second driving mode based on the first determined result signal”

Petitioner contends that Duan discloses limitation [f] of claim 1 by its disclosure of transistor switch 362. Pet. 38–43 (citing Ex. 1005 ¶ 61, Fig. 16; Ex. 1002 ¶¶ 126–134). Specifically, based on the determined result signal described above, “when the external power supply V_x is the high-frequency power supply, the transistor switch 362 is turned on via the filter resistor R_f and the filter capacitor R_f ; conversely, when the external power

supply V_x is the low-frequency power supply, the transistor switch 362 is turned off.” *Id.* at 40–41 (quoting Ex. 1003 ¶ 61).

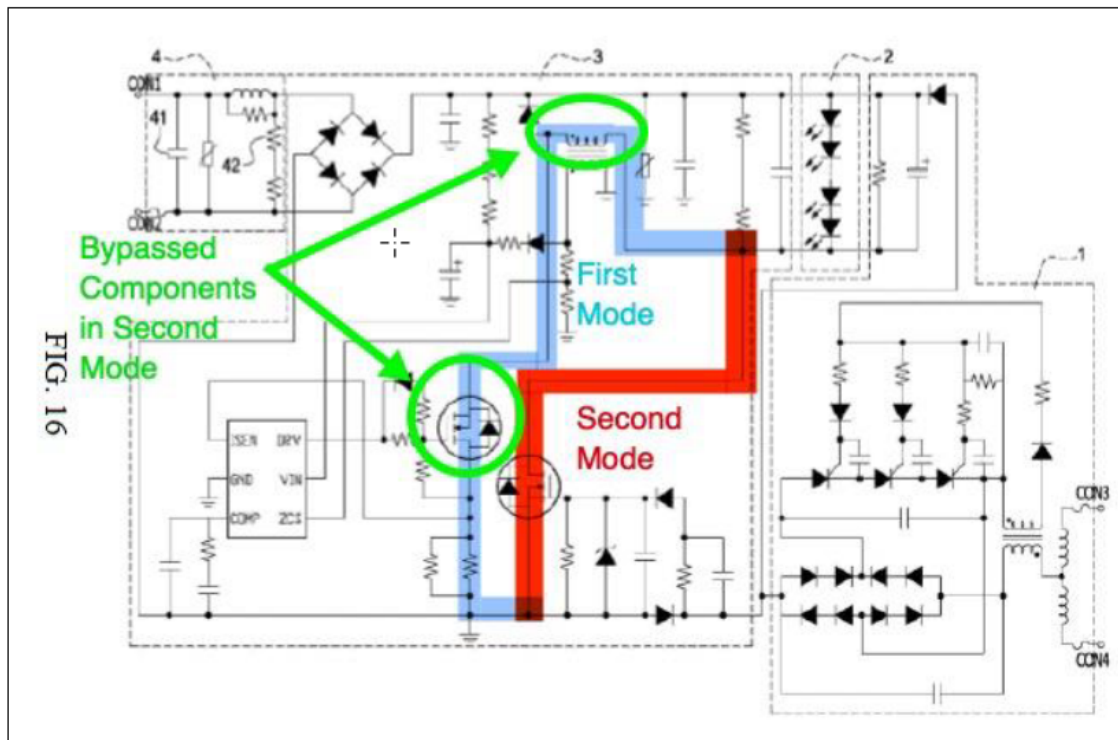
Patent Owner makes no arguments contesting the prior art teachings of this claim limitation except as regarding “first driving mode,” which is addressed below. *See generally* PO Resp. We have reviewed the record, and find that Petitioner shows that Duan discloses limitation [f] of claim 1.

viii. Limitation [g]

“wherein the driving circuit is configured to receive a filtered signal from the filtering circuit and drive the LED module to emit light when performing the first driving mode, and the filtered signal bypasses at least a component of the driving circuit to drive the LED module to emit light when performing the second driving mode”

Petitioner contends that Duan teaches limitation [g] of claim 1 by its disclosure of a first driving mode and second driving mode as described above. Pet. 43–49.

Petitioner provides an annotated version of Figure 16, reproduced below, to explain which circuits are bypassed. *Id.* at 48.



Petitioner provides an annotated version of Figure 16, reproduced above, which circuits are bypassed (in green) in the alleged First Mode of operating Duan (in blue) as opposed to the Second Mode of operating (in red). *Id.*

Patent Owner argues that Duan does not disclose the claim’s “first driving mode.” PO Resp. 83–86. Patent Owner argues, under its construction of “first driving mode,” that Duan does not use a low frequency external driving signal supplied to the LED tube lamp in a double-ended configuration. *Id.* Given that we did not adopt Patent Owner’s construction, as explained above in Section III.B., we are not persuaded by this argument that is not commensurate with the proper scope of the claims.

We have reviewed the record, and find that Petitioner shows that Duan teaches limitation [g] of claim 1.

ix. Conclusion

Having considered all the evidence and arguments of record, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 1 is anticipated by Duan.

b. Claims 7 and 12–18

Claims 7 and 12–18 each depend directly or indirectly from claim 1. Petitioner asserts that Duan discloses the limitations of dependent claims 7 and 12–18. Pet. 49–66. We have reviewed the record and find that Petitioner provides sufficient evidence that Duan discloses the limitations of these dependent claims. Patent Owner makes no arguments contesting the prior art teachings of the limitations of these claims.⁶ *See generally* PO Resp.

Having considered all the evidence and arguments of record, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 7 and 12–18 are anticipated by Duan.

⁶ Patent Owner makes arguments specific to claim 14 in its Sur-Reply. Sur-Reply 17–18. We determined that Patent Owner waived any argument specific to claim 14 by failing to raise that argument in its Patent Owner Response. Paper 37. Patent Owner did not request rehearing of that decision. We do not change that decision here. It is a long-standing practice in IPR proceedings that arguments not raised in the Patent Owner Response are waived. *See* Paper 16, 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”). Additionally, “[a] sur-reply may only respond to arguments raised in the corresponding reply” 37 C.F.R. § 42.23(b).

V. CONCLUSION

For the foregoing reasons, we determine that Petitioner has established by a preponderance of the evidence the unpatentability of claims 1, 7, and 12–18 of the '826 patent.⁷

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 7, 12–18	102(a)(1)	Duan	1, 7, 12–18	
Overall Outcome			1, 7, 12–18	

VI. ORDER

Accordingly, it is

ORDERED that claims 1, 7, and 12–18 of U.S. Patent No. 9,807,826 B2 are unpatentable;

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

⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

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