

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SIMPSON STRONG-TIE COMPANY INC.,
Petitioner,

v.

COLUMBIA INSURANCE COMPANY,
Patent Owner.

PGR2023-00047 (Patent 11,649,626 B2)
PGR2023-00048 (Patent 11,649,626 B2)
PGR2023-00049 (Patent 11,649,626 B2)¹

Before SCOTT A. DANIELS, NEIL T. POWELL, and
STEPHEN E. BELISLE, *Administrative Patent Judges*.

BELISLE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 328(a)

¹ We issue one Final Written Decision for entry in each proceeding. The parties may not use this style caption without our permission.

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This is a consolidated Final Written Decision covering each of three post-grant reviews, namely PGR2023-00047, PGR2023-00048, and PGR2023-00049, and shall be entered in each of these proceedings.

I. INTRODUCTION

Simpson Strong-Tie Company Inc. (“Petitioner” or “Simpson”) concurrently filed three Petitions collectively requesting post-grant review of claims 1–105 (i.e., all claims (“Challenged Claims”)) of U.S. Patent No. 11,649,626 B2 (Ex. 1001², “the ’626 patent”)³, namely, PGR2023-00047 (Paper 1, “-00047 Petition”), PGR2023-00048 (Paper 3, “-00048 Petition”), and PGR2023-00049 (Paper 1, “-00049 Petition”) (collectively, “the Petitions”). The -00047 Petition addresses claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102; the -00048 Petition addresses claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105; and the -00049 Petition addresses claims 1, 9–15, 21, 29–38, 53, 61–67, 73, and 81–91. Columbia Insurance Company (“Patent Owner” or “Columbia Insurance”) did not file a Preliminary Response to any of these Petitions. We instituted post-grant review of all Challenged Claims on all grounds of unpatentability alleged in the three Petitions. Paper 7 (-00047 PGR); Paper 7 (-00048 PGR); Paper 7 (-00049 PGR).

² Unless the context indicates otherwise, citations to exhibits or papers are to those in PGR2023-00047. In each of Sections III.D (PGR2023-00047), III.E (PGR2023-00048), and III.F (PGR2023-00049), citations to exhibits or papers are to those in the respective case unless context indicates otherwise.

³ A Certificate of Correction issued on June 13, 2023, concerning claims 42, 52, 84, 95, and 105 of the ’626 patent. Ex. 1001 (last page).

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After institution, Patent Owner filed a Response (“PO Resp.”) (Paper 9 (-00047 PGR); Paper 10 (-00048 PGR); Paper 9 (-00049 PGR)), Petitioner filed a Reply (“Pet. Reply”) (Paper 11 (-00047 PGR); Paper 12 (-00048 PGR); Paper 11 (-00049 PGR)), and Patent Owner filed a Sur-reply (“PO Sur-reply”) (Paper 12 (-00047 PGR); Paper 13 (-00048 PGR); Paper 12 (-00049 PGR)) in each of the three proceedings. Patent Owner and Petitioner waived oral hearing and rested on their submitted briefs in each of these proceedings. Paper 13.

We have jurisdiction under 35 U.S.C. § 6 (2024). Under the applicable evidentiary standard, Petitioner has the burden to prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 326(e); 37 C.F.R. § 42.1(d) (2023). “Preponderance of the evidence means the greater weight of evidence, evidence which is more convincing than the evidence which is offered in opposition to it.” *United States v. C.H. Robinson Co.*, 760 F.3d 1376, 1383 (Fed. Cir. 2014) (internal quotations omitted). This consolidated Final Written Decision is issued pursuant to 35 U.S.C. § 328(a) and 37 C.F.R. § 42.73.

For the reasons discussed below, we determine Petitioner has established by a preponderance of the evidence that claims 1–37, 39–90, and 92–105 (*but not claims 38 and 91*) of the ’626 patent are unpatentable.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies itself and its parent company, Simpson Manufacturing Co., Inc., as real parties in interest. Pet. 161.

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Patent Owner states:

[Patent Owner] is a subsidiary of BH Columbia, Inc., which is a subsidiary of Berkshire Hathaway Inc.

MiTek Inc. is the exclusive licensee of the ‘626 patent. MiTek Inc. is a subsidiary of MiTek Holdings, Inc., which is a subsidiary of MiTek Industries, Inc., which is a subsidiary of Berkshire Hathaway Inc.

Paper 4, 2.

B. Related Matters

At the time of the Petitions’ filings, the parties identified the ‘626 patent as a continuation of U.S. Patent No. 11,021,867 B2 (“the ‘867 patent”). Pet. 161; Paper 4, 2–3. The ‘867 patent was involved in post-grant proceeding *Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2021-00109, Paper 73 (PTAB Mar. 15, 2023), and our Final Written Decision in that case was affirmed by the U.S. Court of Appeals for the Federal Circuit. *See Simpson Strong-Tie Co. Inc. v. Columbia Ins. Co.*, No. 2023-1944, 2025 WL 39807, at *1 (Fed. Cir. Jan. 7, 2025). The ‘626 patent and ‘867 patent are involved in a civil action in *Columbia Insurance Company et al. v. Simpson Strong-Tie Company Inc.*, No. 4:23-cv-02432 (N.D. Cal.) (“the ‘626 Litigation”). Pet. 161–62; Paper 4, 2–3.

The parties identified the ‘867 patent as a continuation of U.S. Patent No. 10,316,510 (“the ‘510 patent”). Pet. 161; Paper 4, 3. The ‘510 patent was involved in post-grant proceeding *Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2019-00063, Paper 52 (PTAB Mar. 11, 2021), and our Final Written Decision in that case also was affirmed by the Federal Circuit. *See Columbia Ins. Co. v. Simpson Strong-Tie Co. Inc.*,

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Nos. 2021-2145, 2021-2157, 2023 WL 2733427, at *1 (Fed. Cir. Mar. 31, 2023); Pet. 161; Paper 4, 3. The '510 patent also is involved in a civil action in *Columbia Insurance Company et al. v. Simpson Strong-Tie Company Inc.*, No. 3-19-cv-04683 (N.D. Cal.). Paper 4, 3.

Patent Owner also identified U.S. Patent Application No. 18/112,843, filed February 22, 2023, as claiming benefit of the '626 patent. Paper 4, 3. We note that this application issued as U.S. Patent No. 11,920,339 B2 on March 5, 2024, and is the subject of pending post-grant review PGR2024-00050. We also note that Patent Owner filed U.S. Patent Application No. 18/492,460 on October 23, 2023, which is a continuation of the '843 application, and filed U.S. Patent Application No. 18/520,333 on November 27, 2023, which is a continuation of the preceding '460 application.⁴

C. The '626 Patent

The '626 patent is titled “Hanger For Fire Separation Wall,” and issued on May 16, 2023, from U.S. Application No. 17/235,349, filed April 20, 2021. Ex. 1001, codes (10), (21), (22), (45), (54). The '626 patent claims priority through a series of continuing applications to U.S. Provisional Application No. 61/922,531, filed December 31, 2013. Ex. 1001, codes (60), (63).

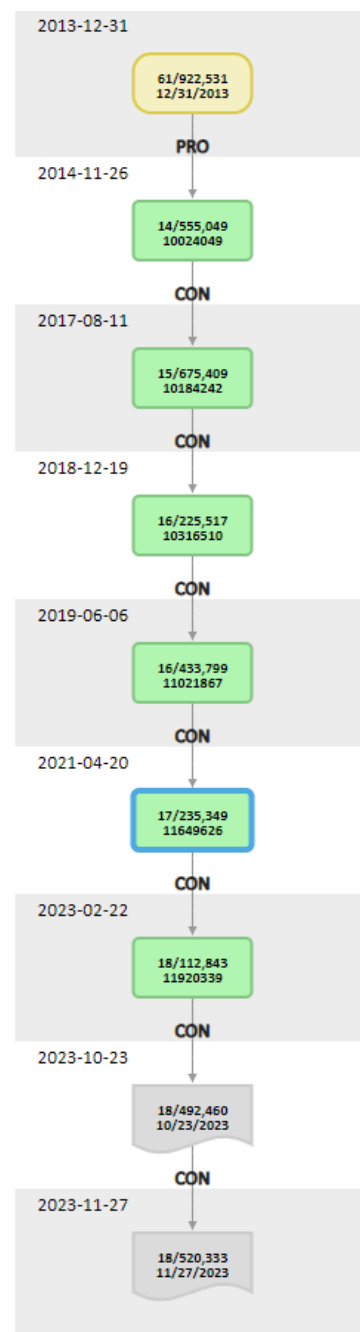
⁴ We remind the parties of their duty of candor pursuant to 37 C.F.R. § 42.11 and duty to update mandatory notices pursuant to 37 C.F.R. § 42.8(a)(3).

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Indeed, the '626 patent—the subject of the three Petitions—is one of many patents and pending patent applications in a chain of continuation applications that includes the '510 and '867 patents, which were previously challenged in post-grant reviews before the Board. *See supra* Section II.B. The illustration at right depicts the continuity map for the '626 patent, as generated by the USPTO's PE2E–Docket and Application Viewer.

The Board has been considering the subject matter of the '626 patent since Petitioner requested post-grant review of the related '510 patent on September 5, 2019, i.e., for over five years now. *See* PGR2019-00063, Paper 52. To date, the Board has held claims 1–20 (all claims) of the '510 patent *unpatentable*, which decision was *affirmed* on appeal to the Federal Circuit; and has held claims 1–12, 15–17, and 21–23 (but not claims 13, 14, and 18–20) of the '867 patent *unpatentable*, which decision also was *affirmed* on appeal to the Federal Circuit. *See supra* Section II.B.

While the Board was considering patentability of the claims of the '867 patent (August 13, 2021 (Petition) – March 15, 2023 (Final Written Decision)), Patent Owner prosecuted and procured the 105 claims of the



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'626 patent (*see* Ex. 1002 (April 20, 2021 (Filing Date) – February 28, 2023 (First Notice of Allowance) – March 20, 2023 (Second Notice of Allowance) – April 12, 2023 (Third/Final Notice of Allowance))). The 105 claims of the '626 patent amount to more than *twice* the number of claims of the '510 and '867 patents *combined*. Based on our review of the over 7,300 words and thirteen columns of claims in the '626 patent, independent claims 1 and 53 with their 103 *dependent* claims create, perhaps strategically, a spiderweb of variously defined fire wall hangers that, at their core, involve the same three primary components as in the claims of the '510 and '867 patents, namely, a channel-shaped portion, a connection portion, and an extension portion.

More specifically, the '626 patent relates to “a truss hanger for connecting a truss to a wall including fire retardant sheathing,” as shown, for example, in Figure 2 of the '626 patent, reproduced below. Ex. 1001, 1:21–22, Fig. 2.

FIG. 2

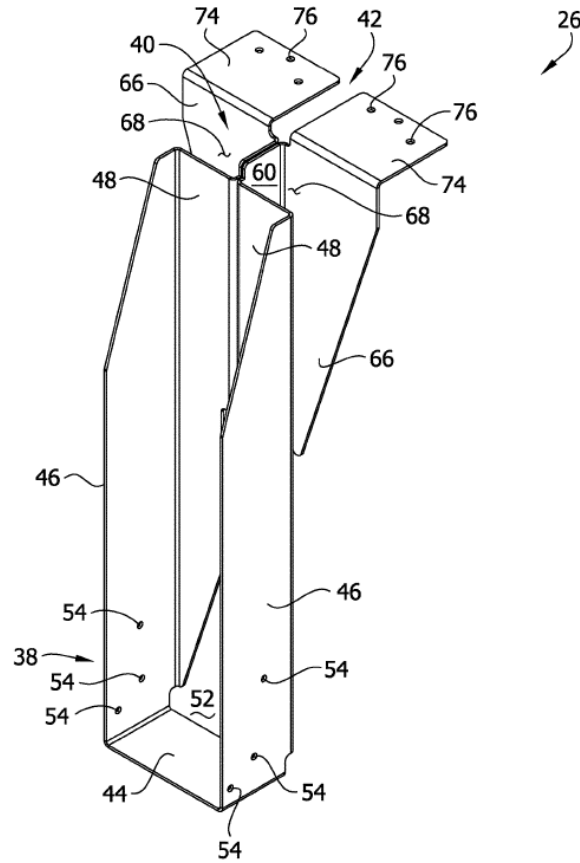


Figure 2 is a perspective view of a truss hanger.

Id. at 2:59–60.

Figure 2 shows truss hanger 26 having three main portions: channel-shaped portion 38, extension portion 40, and connection portion 42. Ex. 1001, 4:34–36. Channel-shaped portion 38 is configured to receive floor truss 12 (not shown), and includes seat or base 44 and a pair of side panels 46 extending upward from base 44. *Id.* at 4:36–39. When installed, base 44 is generally horizontal, and side panels 46 extend generally vertical from base 44. *Id.* at 4:39–41. Back panel 48 extends from each of side panels 46, and each back panel 48 is generally perpendicular to both side

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panels 46 and base 44. *Id.* at 4:41–44. When installed, each back panel 48 extends generally parallel to interior face 50 of fire retardant sheathing 34 (not shown). *Id.* at 4:44–47.

Extension portion 40 includes two extension flanges 60 configured to extend through fire retardant sheathing 34 (not shown). Ex. 1001, 5:1–3. Each flange 60 extends from one of back panels 48, and is “positioned in opposed, face-to-face relation,” “preferably engag[ing] each other along a juncture.” *Id.* at 5:3–6. Back flange 66 extends generally perpendicular from each of extension flanges 60, and is oriented generally parallel to back panels 48. *Id.* at 5:19–22.

Connection portion 42 includes a pair of connector tabs 74 extending from back flanges 66. Ex. 1001, 6:37–39. Each connector tab 74 extends generally perpendicular from one of back flanges 66, and is generally horizontal when hanger 26 is installed. *Id.* at 6:39–42.

Truss hanger 26 mounts to framing of a wall during construction as shown in Figure 10 of the ’626 patent, reproduced below. Ex. 1001, 5:32–41.

FIG. 10

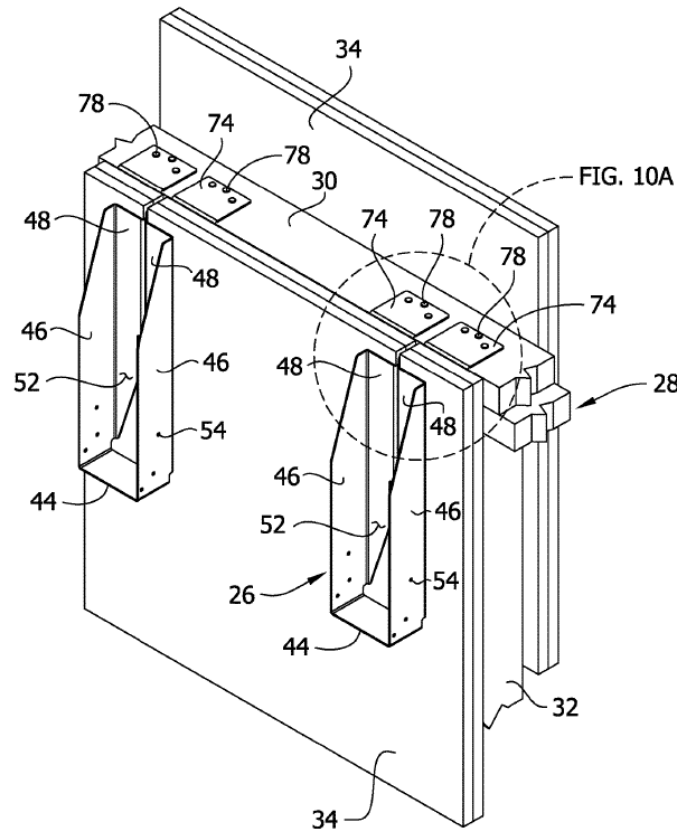


Figure 10 is a perspective view of wall 28 having fire retardant sheathing 34 with a slot cut in the sheathing to receive truss hanger 26.

Id. at 3:4–5. Once installed, a portion of fire retardant sheathing 34 extends into each sheathing channel 68 and is secured between back panels 48 and back flanges 66. *Id.* at 5:38–41. According to the '626 patent, an exemplary embodiment of fire retardant sheathing 34, as shown in Figure 10 for example, is gypsum board, such as two layers of 5/8" gypsum board. *Id.* at 4:18–24.

According to the '626 patent, the use of truss hanger 26 allows for the mounting of joists or beams to fire separation walls with less interruption to the wall's fire retardant sheathing, thus minimizing any reduction in the wall's fire resistant rating. *See* Ex. 1001, 1:26–42.

D. Illustrative Claim

The '626 patent includes 105 claims, all of which are challenged over the three Petitions. Claims 1 and 53 are independent claims. Claim 1 is illustrative and reproduced below with labels, such as “[1.1],” added to limitations in the same manner as used by the parties.

1. [1.P] A fire wall hanger for connecting a structural component to a frame wall adapted to have two layers of $\frac{5}{8}$ -inch-thick drywall mounted thereon to form a fire separation wall, the fire wall hanger comprising:

[1.1] a channel-shaped portion configured to receive the structural component;

[1.2.A] a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and [1.2B] a back flange extending from an edge of the top flange, the back flange arranged to engage a vertical face of the top plate of the frame wall, the back flange having a front surface lying in a back flange plane; and

[1.3.A] an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion, [1.3.B] the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of $\frac{5}{8}$ -inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane;

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[1.4] wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another.

Ex. 1001, 12:14–36.

E. Evidence of Record

Petitioner relies on various of the following patent and published patent application evidence in the three Petitions.

Name	Patent Document	Exhibit
Bundy	U.S. Patent No. 9,394,680 B2, issued July 19, 2016	1007
Gilb '416	U.S. Patent No. 4,230,416, issued October 28, 1980	1011
Cullen	U.K. Patent App. Pub. 2451853A, published February 18, 2009	1039
Adams	European Patent Pub. 0210744B1, published February 27, 1991	1040
Yamaguchi	Japanese Design Patent D1213894, issued August 9, 2004	1041

Pet. 1–3 (-00047, -00048, -00049 PGRs).

Petitioner also relies upon Declarations of W. Andrew Fennell in each of the subject cases (Exs. 1003, 1046 (-00047, -00048, -00049 PGRs)).

Patent Owner did not file or otherwise submit *any* expert testimony in any of the -00047, -00048, -00049 PGRs. *See, e.g.*, Pet. Reply 1 (“[T]he Petition and its accompanying declaration (EX1003) by expert Mr. Fennell stand **unrebutted** by any expert declaration or cross-examination testimony.”).

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F. Asserted Challenges to Patentability

We instituted post-grant review of claims 1–105 of the ’626 patent on the following grounds asserted by Petitioner. Paper 7 (-00047, -00048, -00049 PGRs); Pet. 3 (-00047 PGR); Pet. 2–3 (-00048 PGR); Pet. 2–3 (-00049 PGR).

Claims Challenged	35 U.S.C. §	References
1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, 99–102	103	Yamaguchi, Bundy
1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, 99–102	103	Cullen, Bundy
1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, 99–102	103	Adams, Bundy
1 ⁵ , 39–44, 53, 92–97	103	Yamaguchi, Bundy
22–27, 45, 50–52, 74–79, 98, 103–105	103	Yamaguchi, Bundy, Adams
1, 22–27, 39–45, 50–53, 74–79, 92–98, 103–105	103	Cullen, Bundy
1, 22–27, 39–45, 50–53, 74–79, 92–98, 103–105	103	Adams, Bundy
1, 9–14, 21, 29, 30, 32–36, 38, 53, 61–66, 73, 81, 82, 84–89, 91	103	Yamaguchi, Bundy
15, 31, 37, 67, 83, 90	103	Yamaguchi, Bundy, Gilb ’416

⁵ Petitioner challenges the patentability of independent claims 1 and 53 on the same grounds and in the same manner across the three Petitions. We repeat those claim numbers in the challenged claim groupings in this chart to mirror the groupings across the three Petitions.

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1, 9–15, 21, 29–38, 53, 61–67, 73, 81–91	103	Cullen, Bundy
1, 9–14, 21, 29, 30, 32–36, 38, 53, 61–66, 73, 81, 82, 84–89, 91	103	Adams, Bundy
15, 31, 37, 67, 83, 90	103	Adams, Bundy, Gilb ’416

III. PATENTABILITY

A. *Applicable Law*

Petitioner challenges the patentability of claims 1–105 of the ’626 patent on grounds that the claims would have been obvious under 35 U.S.C. § 103 in light of various references, namely Yamaguchi, Bundy, Cullen, Adams, and Gilb ’416. In a post-grant review, the petitioner has the burden from the onset to show *with particularity* why the patent it challenges is unpatentable. *See* 35 U.S.C. § 322(a)(3) (requiring post-grant review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”); *cf. Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[I]t was [Petitioner’s] burden to explain to the Board how [the combination of prior art] rendered the challenged claims unpatentable.”). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to

which the claimed invention pertains.” 35 U.S.C. § 103; *see KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when of record, objective evidence of obviousness or non-obviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Secondary considerations may include the following: “commercial success, long felt but unsolved needs, failure of others, etc.”⁶ *Id.* The totality of the evidence submitted may show that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The Supreme Court has made clear that we apply “an expansive and flexible approach” to the question of obviousness. *Id.* at 415. Whether a patent claiming a combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To reach this conclusion, however, requires more than a mere showing that the prior art includes separate references covering each

⁶ Patent Owner did not present any objective evidence of non-obviousness.

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separate limitation in a claim under examination. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention. *Id.* “To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

We analyze the challenges presented in the Petitions in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art, at the time of the effective filing date of the ’626 patent, “would have had an education background of, or practical experience providing an equivalent to, a Bachelor of Science in Mechanical Engineering, Structural Engineering or a related/equivalent field and at least four years of work experience in construction connector design/development.” Pet. 11 (citing Ex. 1003 ¶¶ 12–15). Patent Owner does not dispute this assessment. PO Resp. 17–18.

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are

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made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). The level of ordinary skill in the art also may be reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Neither party argues that the outcome of these cases would differ based on our adoption of any particular definition of the level of ordinary skill in the art. Considering the subject matter of the ’626 patent, the background technical field, the prior art, and Petitioner’s proposed and undisputed definition of the skilled artisan, we apply the level of skill set forth above, which is consistent with the testimony of Mr. Fennell (Ex. 1003 ¶¶ 12–15).

C. Claim Construction

We construe claims “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), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.200(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

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*, 415 F.3d at 1312–13; *see CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir.

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2002) (There is “a ‘heavy presumption’ that a claim term carries its ordinary and customary meaning.”). “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.

Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. PGR2019-00063

In PGR2019-00063, which involved the ’510 patent (a grandparent of the ’626 patent), we construed certain claim limitations also relevant to this case, namely:

(1) “*extend through*”: in the context of element A “extend[ing] through” element B, “extend through” means “element A extends into one side and out the other side of element B” (*Simpson Strong-Tie Company Inc.*

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v. Columbia Insurance Company, PGR2019-00063, Paper 52, 44–45 (PTAB Mar. 11, 2021));

(2) “*configured to extend through*” the sheathing⁷: in the context of “an extension portion extending from the channel-shaped portion and configured to extend through the sheathing,” an “extension portion . . . configured to extend through the sheathing” means (or requires structurally) “an extension portion extending from the channel-shaped portion towards the connection portion and defining a space to receive sheathing” (*id.* at 51; *see id.* at 41–52);

(3) “*extending from*”: in the context of element B extending from element A, “extending from” means “the beginning of element B’s extension is on element A” (*id.* at 110; *see id.* at 106–110); and

(4) “*rigidly fixed*”: “rigidly fixed” means “components are connected such that they do not move freely with respect to one another” (*id.* at 98; *see id.* at 96–98). We maintain these same constructions for these terms in this case for the same reasons given in PGR2019-00063.

2. PGR2021-00109

In PGR2021-00109, which involved the ’867 patent (an immediate parent of the ’626 patent), we construed certain claim limitations also relevant to this case, namely:

⁷ Petitioner argues “‘sheathing,’ as construed by the Board in the ’510 and ’867 patents, is equivalent to ‘drywall’ of the ’626 patent.” Pet. 12 n.1. We agree that “sheathing” includes “drywall.”

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(1) “*each extension flange lying in an extension flange plane*”: means “for each extension flange an extension flange plane is within the extent of the extension flange from the channel-shaped portion to the connection portion” (*Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2021-00109, Paper 73, 31 (PTAB Mar. 15, 2023)); and

(2) “*configuring extension flanges to extend into one side and out the other side of sheathing*”: configuring extension flanges to extend through sheathing, i.e., to extend into one side and out the other side of sheathing, means “the extension flanges define a space between the back flange of the connection portion and the channel-shaped portion to receive sheathing therein” (*id.* at 68; *see id.* at 56–69). We maintain these same constructions for these terms in this case for the same reasons given in PGR2021-00109.

Petitioner submits, “[g]iven the Specification is identical between the present patent and the ’510 and ’867 Patents (the subject of the Board’s prior decisions), Petitioner applies the same construction to the same terms in the present claims.” Pet. 13. Patent Owner does not dispute the foregoing constructions for these terms in the subject cases. PO Resp. 18–19 (-00047 PGR)

3. *The Present Cases*

In the three subject cases, the parties dispute the meaning of the terms (a) “channel-shaped portion,” as recited in independent claims 1 and 53 (*see, e.g.*, PO Resp. 19-20; Pet. Reply 3–5 (both -00047 PGR)), and (b) “the first and second extension flanges engaging each other along a juncture,” as

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recited in dependent claims 38 and 91 (*see, e.g.*, Pet. 58–60; PO Resp. 41–43; Pet. Reply 5–7; PO Sur-reply 4–7 (all -00049 PGR)). The parties otherwise do not contend that claim construction is necessary to resolve the controversy in this case. To the extent necessary to resolve the controversy before us, we address claim interpretation in our patentability analysis below.

D. PGR2023-00047

The -00047 Petition addresses claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 of the ’626 patent.

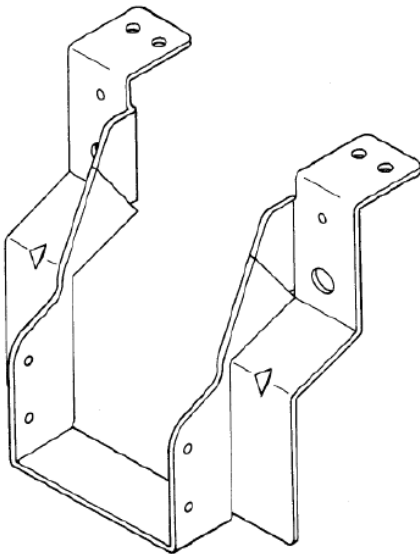
1. Obviousness of Claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 over the Combination of Yamaguchi and Bundy

Petitioner contends claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi (Ex. 1041) and Bundy (Ex. 1007). Pet. 6–11, 15–68; Pet. Reply 2–19. Patent Owner opposes Petitioner’s contentions. PO Resp. 21–30; PO Sur-reply 1–4. For the reasons expressed below, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. We turn first to overviews of Yamaguchi and Bundy.

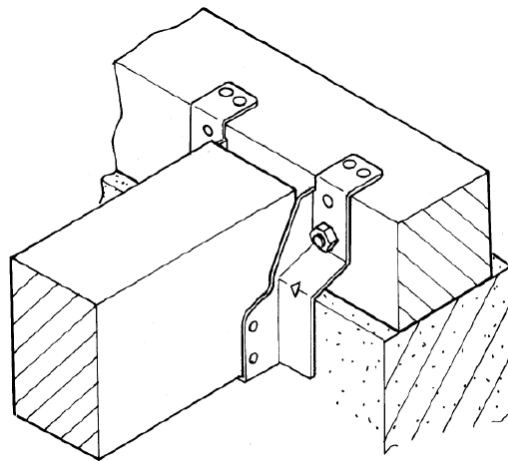
a) Overview of Yamaguchi

Yamaguchi is a Japanese design publication and generally is directed to “a joist bracket [i.e., a hanger] that is attached to [a] sill[] and bears a joist

bridging the sill[] [to another sill],” as shown, for example, in a “Perspective View” (page 2) and “Reference Diagram Illustrating Usage State” view (page 5), reproduced below. Ex. 1041, 1, 2, 4, 5; *see* Pet. 16 n.2.



Perspective View



Reference Diagram Illustrating
Usage State

Id. Yamaguchi explains that the left side of its bracket is symmetrical to the right side. *Id.* at 1.

Petitioner contends Yamaguchi discloses “each and every structural element listed in independent claims 1 and 53 but does not explicitly disclose that the space defined between its channel-shaped portion and back flange is sized large enough to receive two layers of 5/8-inch-thick drywall therein,” for which Petitioner relies on Bundy. Pet. 16 (internal footnote omitted).

b) Overview of Bundy

Bundy generally is directed to “a joist hanger adapted to secure a joist to a header or other support member with a first drywall panel between the

Figure 1 of Bundy is an upper right perspective view of a connection formed in which the joist hanger has a pair of top flanges.

We further discuss below the disclosures of Yamaguchi and Bundy in connection with Petitioner's arguments.

c) Independent Claim 1

The parties dispute whether the combination of Yamaguchi and Bundy would have taught or at least fairly suggested to the skilled artisan two limitations, namely “[1.3.B] the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of $\frac{5}{8}$ -inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane”; and “[1.3.A] an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion.” Pet. 26–30; PO Resp. 21–30; Pet. Reply 5–19; Ex. 1001, 12:26–33.

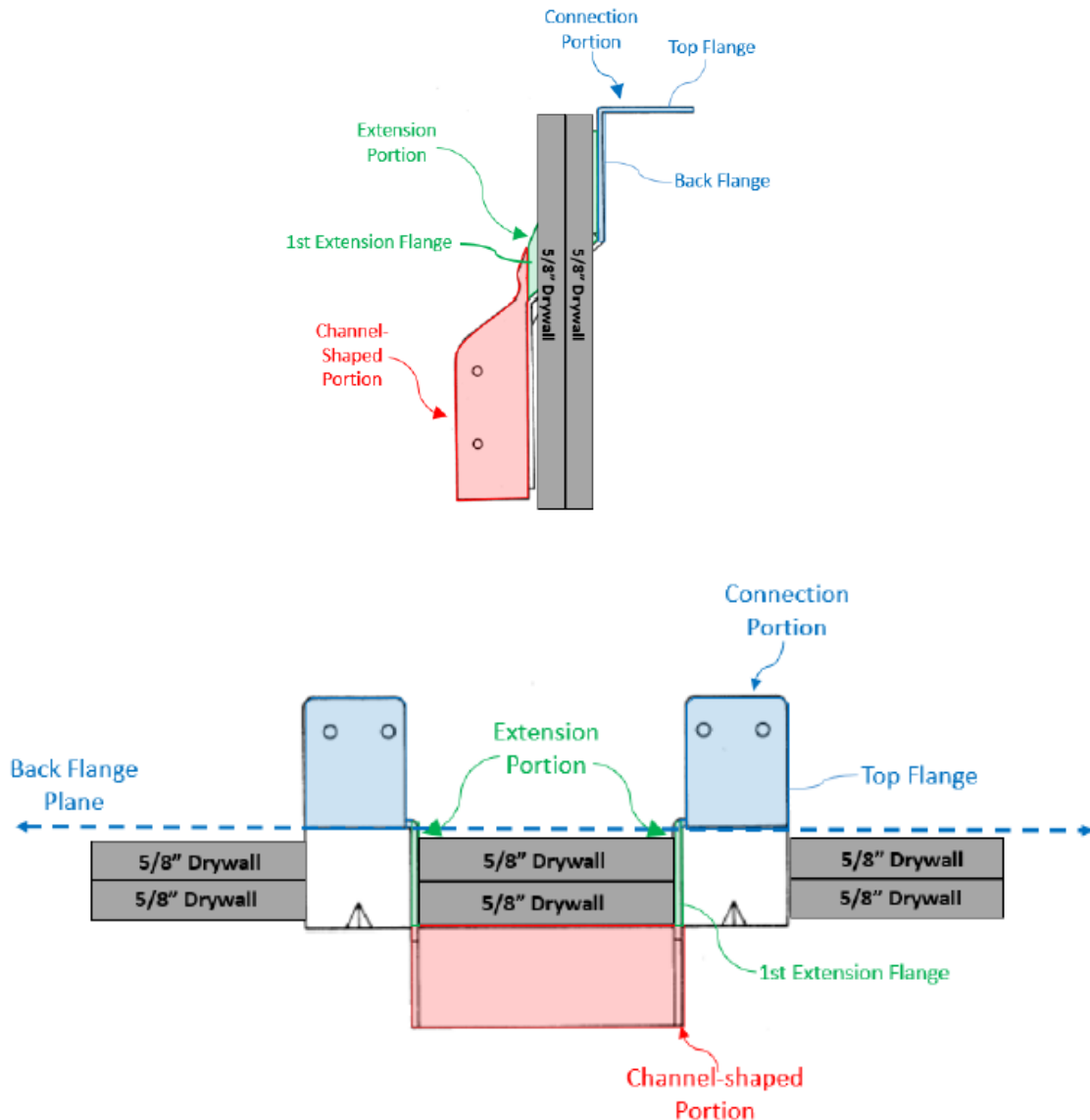
(1) *“[1.3.B] the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of $\frac{5}{8}$ -inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane”*

Claim 1 recites, *inter alia*, “the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of $\frac{5}{8}$ -inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane.” Ex. 1001, 12:28–33.

Petitioner contends Yamaguchi teaches a joist bracket having an extension portion (green below) that defines a space that *would permit drywall to be inserted* between its back flange (blue–vertical portion) and channel-shaped portion (red), as shown, for example, in Petitioner’s

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annotated version of the “Side” and “Plan” views of Yamaguchi’s bracket, reproduced below. Pet. 28–30 (citing Ex. 1003 ¶ 96; Ex. 1041, 2–5).



The above illustration shows the “Side” (top) and “Plan” (bottom) views of Yamaguchi’s bracket as annotated by Petitioner to show “two layers of $\frac{5}{8}$ -inch-thick drywall” “received between the channel-shaped portion and the back flange plane.”

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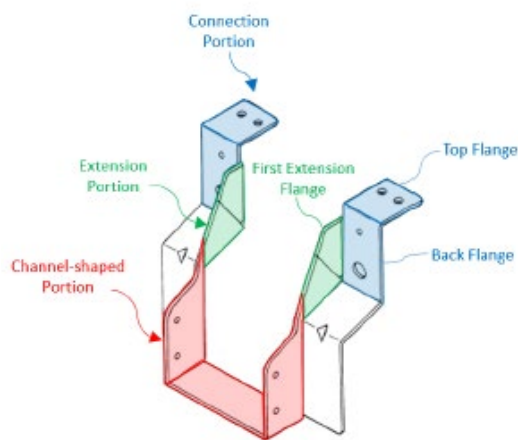
Ex. 1041, 2–5 (annotated); Pet. 28–30.

Although Yamaguchi does not explicitly disclose installing two layers of 5/8-inch-thick drywall between its back flange plane (blue) and channel-shaped portion (red), Petitioner argues the skilled artisan “would have found it obvious to size the length of Yamaguchi’s extension flanges (green) to define a space sufficient for receiving two layers of 5/8-inch-thick drywall therein based on Bundy.” Pet. 28–29 (citing Ex. 1003 ¶ 96). Petitioner argues “Bundy teaches installing two layers of 5/8” sheathing between a hanger’s channel-shaped portion (Bundy’s side members 11) and a wall frame,” and in view of this disclosure, argues the skilled artisan “would have had an expectation of success in defining a specifically-sized drywall space between Yamaguchi’s back flange plane (blue) and channel-shaped portion (red).” Pet. 29 (citing Ex. 1007, 4:46–51, 5:18–20; Ex. 1003 ¶ 96; Ex. 1041, 2–4). As for why, Petitioner argues “Yamaguchi’s and Bundy’s hangers are used for similar purposes (e.g., hanging a joist to a wall),” and “Yamaguchi’s extension portion (green) already defines a space between Yamaguchi’s back flange plane (blue) and channel-shaped portion (red).” Pet. 29 (citing, *inter alia*, Ex. 1007, 4:46–51; Ex. 1003 ¶ 96; Ex. 1041, 2–4).

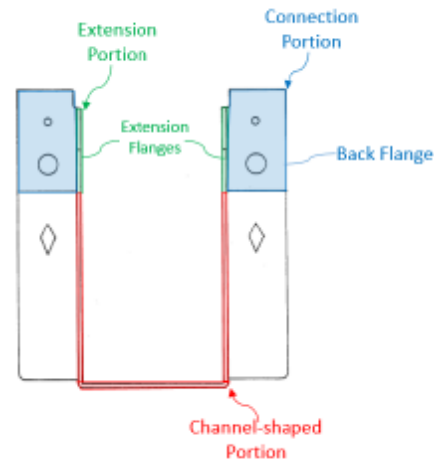
Patent Owner disputes Petitioner’s above application of Yamaguchi and Bundy on two fronts, namely that Yamaguchi allegedly does not disclose any “extension portion” (or “extension flange”) at all, and even if it were deemed to do so, that the combination of Yamaguchi and Bundy would not have taught such an extension portion sized as required by the subject limitation. PO Resp. 21–27. We address these disputes seriatim.

(a) *Yamaguchi Teaches or Fairly Suggests an “Extension Portion”*

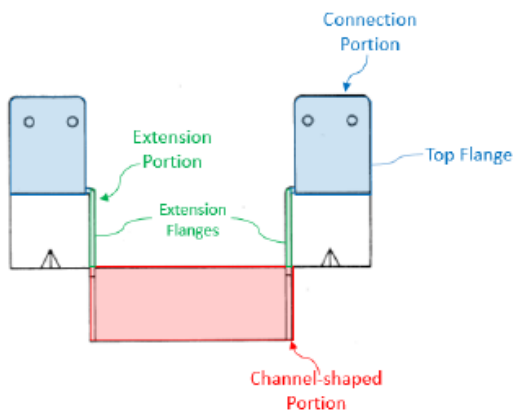
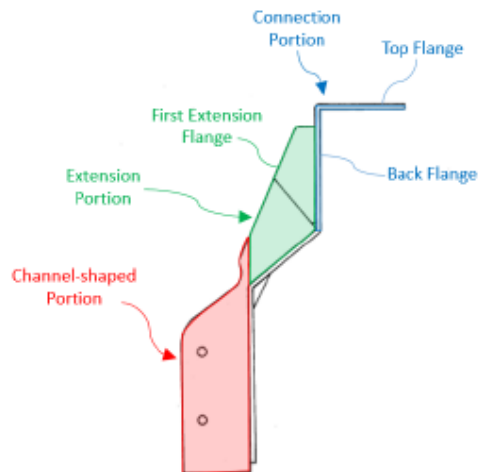
Petitioner contends Yamaguchi teaches a joist bracket having an “extension portion” with an “extension flange,” as shown, for example, in Petitioner’s annotated version of the “Perspective,” “Front,” “Plan,” “Side,” and “Usage” views of Yamaguchi’s bracket, reproduced below. Pet. 26–28 (citing Ex. 1003 ¶ 93; Ex. 1041, 1–5).



Perspective View



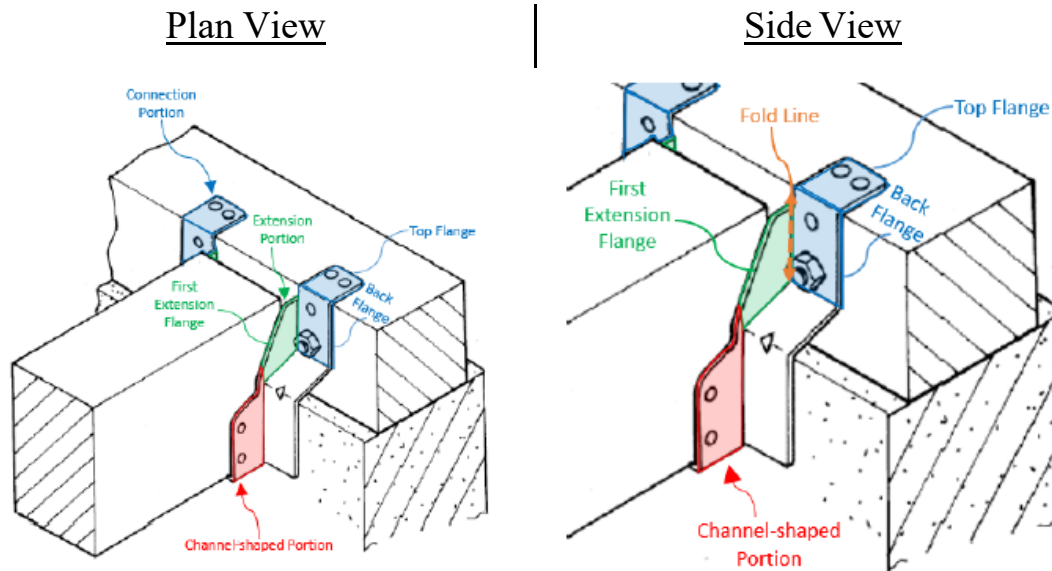
Front View



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Usage View

The above illustration shows the “Perspective,” “Front,” “Plan,” “Side,” and “Usage” views of Yamaguchi’s bracket as annotated by Petitioner to show “an extension portion including a first extension flange.”

Ex. 1041, 2–5 (annotated); Pet. 26–28; *see* Pet. 27–28 (citing Ex. 1003 ¶¶ 94–95, Ex. 1041, 1–5) (proffering how Yamaguchi’s first extension flange extends from the back flange of the connection portion to the channel-shaped portion).

Patent Owner responds that, “[a]s properly construed, the channel-shaped portion of a hanger as required by claims 1 and 53 is that portion of the hanger that forms the channel capable of receiving the joist,” and because Yamaguchi’s joist “is received not only in the portion of the hanger shaded red in the [Petitioner] drawings, but also in the portion shaded green,” that these red and green portions together constitute the “channel-shaped portion,” leaving no “extension portion.” PO Resp. 22–24 (emphasis

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added). We agree with Petitioner and find Patent Owner’s arguments unavailing, and turn to construing the term “channel-shaped portion” as recited, for example, in claim 1.

Claim Construction: “channel-shaped portion”

We turn first to the claim language itself. We are mindful of Judge Rich’s guidance from over thirty years ago: in all aspects of claim construction, “the name of the game is the claim.” *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998) (quoting Giles Sutherland Rich, *Extent of Protection and Interpretation of Claims—American Perspectives*, 21 Int’l Rev. Indus. Prop. & Copyright L. 497, 499 (1990)).

Claim 1 recites, in relevant part, a fire wall hanger having “a channel-shaped *portion* configured to receive the structural component,” “a connection *portion*,” and “an extension *portion*,” and that “the extension portion spac[es] the channel-shaped portion from the [connection portion]” and “the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another.” Ex. 1001, 12:14–36 (emphases added). Claim 1’s repeated use of “portion[s]” to delineate between the three main elements of the hanger, i.e., channel-shaped portion, connection portion, and extension portion, shows or at least strongly suggests substantial flexibility as to the specific location where one “portion” transitions to another “portion” in the fire wall hanger. Similarly, although claim 1 recites that the “channel-shaped portion” is “configured to receive the structural component,” claim 1 recites no limitation precluding other “portions” of the hanger from also “receiv[ing]” or otherwise contacting the structural component.

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Patent Owner argues that “channel-shaped portion” should be construed to mean “[the] portion of the hanger that forms a channel configured to receive the structural component.” PO Resp. 19. Petitioner and its expert, Mr. Fennell, agree with this meaning (Pet. Reply 4; Ex. 1046 ¶¶ 16–20), and so do we. Indeed, claim 1 plainly recites this as discussed above.

But Patent Owner then urges us to narrow the meaning of “portion” itself such that “channel-shaped *portion*” requires “*all portions of the hanger which directly bound the channel that receives the structural component.*” PO Resp. 19 (emphases added). Patent Owner argues the Specification makes this “clear.” *Id.* (citing Ex. 1001, 2:28–31). Contrary to Patent Owner’s arguments (PO Resp. 19), we find no support in claim 1 to further narrow the interpretation of “portion” in “channel-shaped portion” to mean *every portion* of the hanger which directly bounds the channel that receives the structural component. *See* Ex. 1001, 12:14–36 (claim 1). We, like Petitioner, similarly find no support in the Specification or limited prosecution history (*see* Pet. 5–6), and Patent Owner does not direct us to any, showing that the inventor acted as its own lexicographer or disavowed any claim scope to allot this narrowed interpretation to the subject limitation. *See* Pet. Reply 3 (“Nowhere does the ’626 patent specification describe that all portions of the hanger directly bounding channel 52 constitute the channel-shaped portion.” (citing Ex. 1046 ¶¶ 16–18; Ex. 1001, 4:39–47)); PO Resp. 19.

Further, as argued by Petitioner (Pet. Reply 4–5), Patent Owner’s proposed construction limiting “portion” to “all portions” of the hanger that

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“directly bound the channel that receives the structural component” could cause the “channel-shaped portion” *on the same physical hanger* to change depending on which type of structural component an installer were to choose to use in construction:

Patent Owner’s claim construction improperly focuses on the wall assembly intended to be used with the recited hanger. The claims, however, are directed to a hanger, not a wall assembly. When assessing what part of a hanger constitutes a “channel-shaped portion” and an “extension portion,” [the skilled artisan] would consider the physical features of the hanger itself and the natural divisions between those features. [The skilled artisan] would not assess the claim language and its application to the prior art by speculating how an installer might later install the hanger with a joist or an entire wall assembly, which may differ from installation to installation.

Pet. Reply 4 (citing Ex. 1046 ¶ 19). We find this defect further supports a broader interpretation of “channel-shaped portion” as discussed above.

Accordingly, based on the complete record before us, we determine that “channel-shaped portion” should be construed to mean “a portion of the hanger that forms a channel configured to receive the structural component,” without more, and to be clear, “portion” here does not require “all portions of the hanger which directly bound the channel that receives the structural component.”

We note that, in the -00049 PGR, Patent Owner effectively contradicts its own proffered meaning for “channel-shaped portion” by agreeing that Petitioner’s asserted prior art “does teach [extension] flanges,” whereas here Patent Owner’s purpose for its proposed construction is to subsequently argue that the prior art does *not* teach such extension flanges, only channel-

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shaped portions and connection portions. *See* -00049 PGR, PO Resp. 42 (“While the asserted prior art does teach flanges or sidewalls that are in opposed relation to each other, none of Adams, Cullen, or Yamaguchi teach that these flanges or sidewalls engage each other along a juncture.”); *infra* § III.F).

Analysis

Patent Owner’s arguments that Yamaguchi does not disclose any “extension portion” or “extension flange” depend wholly on its proposed construction for “channel-shaped portion” (PO Resp. 22–24), which we reject, as discussed above. Under the proper construction of “channel-shaped portion” (i.e., “a portion of the hanger that forms a channel configured to receive the structural component”) and based on the foregoing, we find Petitioner sufficiently establishes that Yamaguchi teaches or at least fairly suggests the claimed “extension portion” and “extension flange.” *See* Pet. 26–28; Ex. 1003 ¶¶ 93–95; Ex. 1041, 1–5. Indeed, in the -00049 PGR, Patent Owner concedes as much: “the asserted prior art *does teach [extension] flanges* or sidewalls that are in opposed relation to each other.” -00049 PGR, PO Resp. 42 (emphasis added); *see also* -00047 PGR, PO Resp. 26 (Patent Owner recognizing “Yamaguchi’s extension portion”).

(b) The Combination of Yamaguchi and Bundy Teaches or Fairly Suggests an “Extension Portion” Sized as Required by Limitation 1.3.B

Patent Owner argues “Yamaguchi’s hanger design does not have a construction which will accept drywall—of any degree of thickness—between the channel-shaped portion and the back flange plane.” PO

Resp. 25. Patent Owner argues that this is because “*drywall would not be secured over the back flange*, because it is blocked from doing so by the forward projecting pieces of the Yamaguchi hanger,” and “there is no component of the hanger that *prevents the back face of the drywall (or any portion thereof) being secured directly to the face of the wall framing.*” *Id.* at 25–26 (emphases added). Patent Owner argues, in Yamaguchi, “the back flange plane at the front of the back flange does not define the space that receives drywall.” *Id.* at 26. Patent Owner submits, that “[d]espite [Petitioner’s] deceptive annotations that would have the drywall floating in space, the drywall would be installed flush to the wall framing,” and thus, “the back flange plane would be positioned within the drywall space, rather than bounding the spaced that received the drywall.” *Id.* (“Yamaguchi’s extension portion actually defines a space between the *wall*—not the back flange plane—and the channel-shaped portion.”). We find Patent Owner’s arguments unavailing.

First, Petitioner argues, and we agree, that “the back flange plane recited in claim 1 extends beyond the edges of the back flange itself,” and thus, “the presence of Yamaguchi’s ‘forward projecting pieces’ have no bearing on whether drywall [may be] received between the channel-shaped portion and the back flange *plane*.” Pet. Reply 10 (citing Ex. 1046 ¶¶ 30–31); *see id.* at 16 (“The back flange plane in the claims merely serves as a reference point for measuring the claimed distance. It does not create a physical boundary.” (citing Ex. 1046 ¶ 39)).

Second, Patent Owner’s arguments are not commensurate in scope with the subject limitation 1.3.B (and claim 1 as a whole), which defines

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only a *hanger*—an apparatus—and does not require any installed drywall, let alone any drywall installed in a particular manner, for *sizing* the extension portion. *See* Pet. Reply 10 (“Patent Owner improperly imports unclaimed aspects into claim limitations [1.3.B] and [53.4].” (citing Ex. 1046 ¶ 32)). Limitation 1.3.B requires that the “extension portion” be “*sized* large enough *to permit* the two layers of 5/8-inch-thick drywall of the fire separation wall *to be received* between the channel-shaped portion and the back flange plane,” but not that drywall must be installed as part of a wall assembly such that at least some of the drywall rests directly between the metal (structure) of the channel-shaped portion and the metal (structure) of the back flange. *See* Ex. 1001, 12:26–33; Pet. Reply 10–16; Ex. 1046 ¶ 33.

Petitioner persuasively argues, and we agree:

There is certainly no requirement that the hanger contain a component “that *prevents* the back face of the drywall (or any portion thereof) being secured directly to the face of the wall framing” or that the back flange plane “*define*” or “*bound*” the space that receives drywall as alleged by Patent Owner. POR [PO Resp.], 25-26. As explained in the Petition and supported by Mr. Fennell’s testimony, Yamaguchi-Bundy’s modified hanger has an extension portion that is long enough to *permit* two layers of 5/8-inch-thick drywall (i.e., an extending flange having a length over 1 and 1/4 inches) to be *received* between the channel-shaped portion and the back flange plane. Pet., 28-30, 37; EX1003, ¶96. That is all that is required. EX1046, ¶32.

Pet. Reply 12.

As Petitioner’s expert, Mr. Fennell, persuasively testifies, Patent Owner’s attempt to restrict the combined teachings of Yamaguchi and Bundy to an “extension portion” that places the channel-shaped portion

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precisely 1¼" from the wall framing is unrealistic at best, because (1) "this leaves no room for standard manufacturing tolerances, and almost ensures that the drywall could not be received between the channel-shaped portion and the wall without damage"; and (2) "[the skilled artisan] would have known that the size of the extension portion would have to be larger than the width of the intended drywall, to allow the drywall to move between the channel-shaped portion and the wall with no damage." Ex. 1046 ¶ 34 (cited at Pet. Reply 12–13); *see* Pet. Reply 13 (Petitioner noting that "[e]ven the commercial product advertised as covered by the claims of the '626 patent has an extension portion width of 1 1/2 inch, which is 1/4 inch larger than the width of the drywall." (citing Ex. 1048)); Ex. 1046 ¶¶ 35–36 ("[The skilled artisan] would have known to size the hanger's extension flange larger than 1 and 1/4 inch, such that the width would be large enough to 'permit' the two layers of drywall to be 'received between the channel-shaped portion and the back flange plane' even considering the thickness of the back flange.").⁸ Petitioner also persuasively argues, and we agree, that limitation 1.3.B recites "that the extension portion is sized large enough to 'permit' the drywall to be 'received between the channel-shaped portion and the back flange plane'—*there is no requirement that the drywall*

⁸ "When considering obviousness of a claimed invention, the Supreme Court has emphasized that the 'person of ordinary skill is also a person of ordinary creativity, not an automaton.'" *Fleming v. Cirrus Design Corp.*, 28 F.4th 1214, 1223 (Fed. Cir. 2022). We assume the skilled artisan is a person of ordinary creativity with common sense, common wisdom, and common knowledge. *Id.* (citing *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013); *KSR*, 550 U.S. at 421).

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permanently stay there.” Pet. Reply 14 (emphasis added) (citing Ex. 1046 ¶ 37).

Finally, *all* of Patent Owner’s arguments concerning how *the skilled artisan* would have interpreted or understood the teachings of Yamaguchi and Bundy, *as well as of the combination of those references*, are unsupported *attorney*-arguments. *See In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”). Patent Owner cites no *evidence* of how *the skilled artisan* would have understood the combined teachings of Yamaguchi and Bundy, or how such an understanding would support Patent Owner’s attorney arguments. Indeed, Patent Owner did not file any expert testimony in any of the three subject cases, despite that we must resolve the legal question of obviousness on the basis of underlying factual determinations, particularly the scope and content of the prior art and any differences between the claimed subject matter and the prior art *from the vantage point of the skilled artisan*. *Graham*, 383 U.S. at 17–18; *see* Pet. Reply 2 (“As a threshold matter, the Board’s findings in its Institution Decision should be carried forward to its final written decision because Patent Owner did not submit an expert declaration in support of its arguments.”); *but see* PO Sur-reply 1–4 (“[T]here is no requirement that a party rely exclusively on expert testimony in Post Grant Review proceedings or that attorney argument must be disregarded.”). To the contrary, Petitioner’s expert, Mr. Fennell, persuasively testifies in detail how and why the skilled artisan would have combined the teachings and suggestions of Yamaguchi and Bundy to achieve the invention of claim 1, including the features of limitation 1.3.B.

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See, e.g., Ex. 1003 ¶¶ 73–83, 96; Ex. 1046 ¶¶ 30–40. We find Mr. Fennell’s testimony credible (and uncontroverted).

Based on the foregoing and the complete record before us, we find Petitioner sufficiently establishes that the combination of Yamaguchi and Bundy teaches or at least fairly suggests an “extension portion” sized as required in Limitation 1.3.B.

- (2) “[1.3.A] an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion”

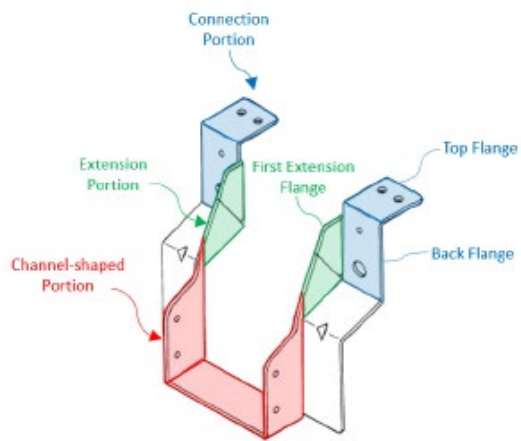
Claim 1 recites, *inter alia*, “an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion.” Ex. 1001, 12:26–28.

As discussed above (and repeated here for simplicity), Petitioner contends Yamaguchi teaches this limitation by disclosing a joist bracket having the recited extension portion with a first extension flange, as shown, for example, in Petitioner’s annotated version of the “Perspective,” “Front,” “Plan,” “Side,” and “Usage” views of Yamaguchi’s bracket, reproduced below. Pet. 26–28 (citing Ex. 1003 ¶ 93; Ex. 1041, 1–5).

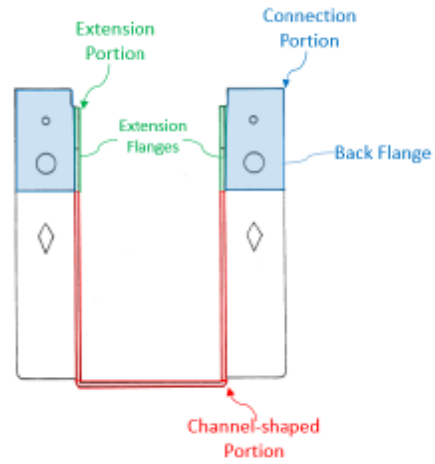
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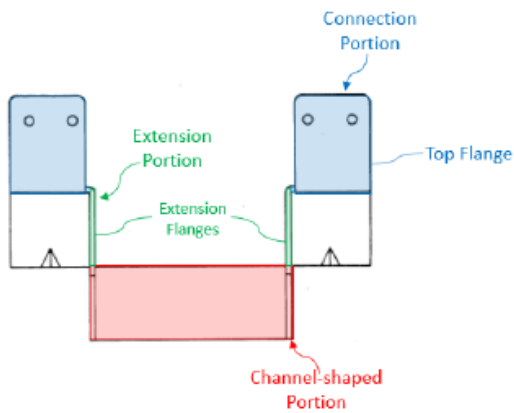
PGR2023-00049 (Patent 11,649,626 B2)



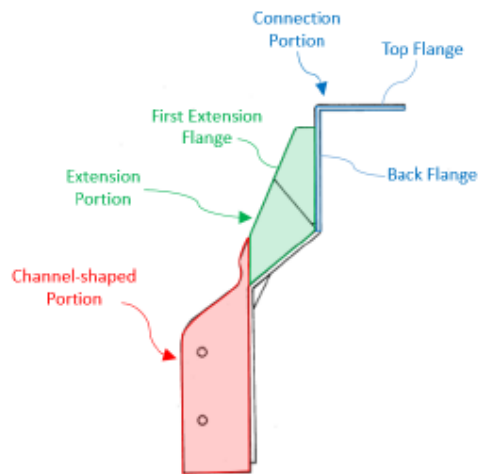
Perspective View



Front View



Plan View

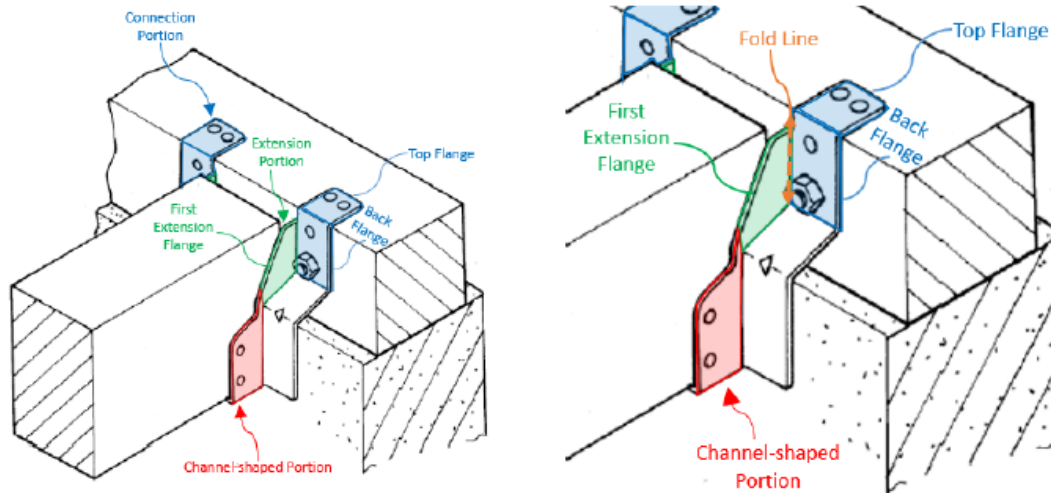


Side View

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Usage View

The above illustration shows the “Perspective,” “Front,” “Plan,” “Side,” and “Usage” views of Yamaguchi’s bracket as annotated by Petitioner to show “an extension portion including a first extension flange.”

Ex. 1041, 2–5 (annotated); Pet. 26–28; *see* Pet. 27–28 (citing Ex. 1003 ¶¶ 94–95, Ex. 1041, 1–5) (proffering how Yamaguchi’s first extension flange extends from the back flange of the connection portion to the channel-shaped portion).

Patent Owner argues “[Petitioner’s] identification of the extension flange in Yamaguchi fails to account for Claim 1’s requirement that a *single* extension flange extends from the connection portion to the channel-shaped portion in the ‘626 Patent.” PO Resp. 28. Patent Owner argues that “[w]hat [Petitioner] identifies as the extension flange in Yamaguchi is actually comprised of a composite of two separate flanges—one extending from the connection portion, the other extending from the back flange,” and thus, “the embodiment does not disclose ‘an extension portion including a first

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extension flange extending from the back flange of the connection portion to the channel-shaped portion.” *Id.* Notwithstanding these arguments, Patent Owner recognizes that Yamaguchi’s “Usage View” (above) plainly shows only a one-piece “extension portion,” but Patent Owner dismisses this teaching as “simply omitting certain details, i.e., the join line crossing the flange” as shown in other drawing views. *Id.* at 29–30.

Petitioner persuasively argues, and we agree, “Patent Owner relies on an unclaimed feature—the first extension flange consisting of a single piece—in an attempt to distinguish the claims over Yamaguchi’s hanger,” but “[c]laim 1 encompasses extension flanges formed from a single piece and multiple pieces,” and “[n]owhere does claim 1 recite that the first extension flange consists of a single piece.” Pet. Reply 17 (citing Ex. 1046 ¶¶ 41–42). As Petitioner’s expert, Mr. Fennell, persuasively testifies:

[The skilled artisan] would have understood that the combination of the two pieces (annotated in green) equates to the ‘first extension flange’ because the two pieces of metal collectively form a thin metal sheet extending from the channel-shaped portion to the back flange of the connection portion to define a space between the channel-shaped portion and the wall. EX1003, ¶94.

Furthermore, [the skilled artisan] would have understood that the line shown across the extension flange of Yamaguchi’s hanger in the perspective, plan, front, and side views may be a weld line between two abutting sections of sheet metal. EX1003, ¶94. By being welded together, the two sections of Yamaguchi’s extension flange shown in the perspective, plan, front, and side views are permanently fastened to each other. Accordingly, the two sections of extension flange (green) shown in the perspective, plan, front, and side views of Yamaguchi constitute a single piece extension flange.

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Ex. 1046 ¶¶ 43–44 (cited at Pet. Reply 18).

Mr. Fennell also persuasively testifies:

[T]he usage view of Yamaguchi’s hanger would have suggested to [the skilled artisan] that the extension flange consists of a single contiguous piece of sheet metal that is folded along the side edge of the back flange. EX1003, ¶94. The absence of the join line along the extension flange in Figure 5 indicates that a contiguous piece of sheet metal is folded at a fold line located between the extension flange (green) and the back flange (blue) of Yamaguchi’s hanger. Furthermore, in related proceeding PGR2023-00048, I explained how Yamaguchi’s hanger, including the first extension flange, can be formed from a single piece of sheet metal.

Ex. 1046 ¶ 46 (cited at Pet. Reply 19). Mr. Fennell’s testimony is uncontroverted.

Based on the foregoing and the complete record before us, we find Petitioner sufficiently establishes that Yamaguchi teaches or at least fairly suggests “an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion” as recited in limitation 1.3.A. *See supra* § III.D.1.c.1.a.

(3) *Reasons to Combine Teachings of
Yamaguchi and Bundy with a Reasonable
Expectation of Success*

Petitioner contends the skilled artisan would have had rational reasons to combine the teachings of Yamaguchi and Bundy to arrive at the invention of independent claim 1 and would have had a reasonable expectation of success in doing so. Pet. 16–20. Patent Owner does not dispute this aspect of the case (except as implicated by the disputed limitations discussed above). *See* PO Resp.; PO Sur-reply. We are persuaded that Petitioner’s

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cited evidence provides sufficient rational reasons to combine Yamaguchi and Bundy to arrive at the invention of claim 1 for the reasons expressed below.

Petitioner argues, *inter alia*, that Yamaguchi teaches a joist hanger with an extension portion defining a space between its back flange and channel-shaped portion, and Bundy teaches to size a space created by an extension portion of its joist hanger to receive two layers of 5/8-inch-thick drywall between its back flange plane and channel-shaped portion. Pet. 16–18 (citing 1003 ¶¶ 75–78; Ex. 1007, 5:16–18, Fig. 1; Ex. 1041 (“Perspective View”; “Usage View”)); *see id.* at 17–18 (discussing “advantages” of two layers of 5/8" drywall as “fire resistance in a fire separation wall”). Petitioner argues the skilled artisan “would have been motivated to receive drywall between Yamaguchi’s back flange and channel-shaped portion to provide a shielded fire resistant wooden frame wall.” Pet. 18 (citing Ex. 1003 ¶¶ 78–79; Ex. 1007, 2:10–24); *see id.* ([“The skilled artisan] would have optimized the size of the spacing between Yamaguchi’s back flange and channel-shaped portion to accommodate two layers of 5/8”-thick-drywall according to the size preference described by Bundy for optimal fire protection and wall integrity.” (citing Ex. 1003 ¶ 80; Ex. 1007, 5:10–22)). Petitioner concludes:

This modification to Yamaguchi would have been nothing more than applying a known technique (Bundy’s spacing a hanger seat from a wall frame by distance sufficient to accommodate two 5/8”-thick-drywall sheets for fire resistance) to a similar device (Yamaguchi’s hanger having a spacing of indeterminate length) to obtain the predictable result of a firewall hanger having a space between its channel-shaped portion and a wall frame large

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enough for receiving drywall therebetween, thereby
“protect[ing] the structural members of a building.”

Pet. 18 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 80).

Petitioner argues the skilled artisan would have had a reasonable expectation of success in modifying Yamaguchi as discussed above, “because doing so would still allow Yamaguchi’s hanger to perform its intended function of securing a joist to a wall.” Pet. 18 (citing Ex. 1041, 1; Ex. 1003 ¶ 81). Petitioner argues, “[r]ecognizing that Yamaguchi’s and Bundy’s hangers are constructed from sheet metal,” the skilled artisan “would have understood how to modify the size of Yamaguchi’s extension portions to accommodate two layers of 5/8”-thick-drywall while still allowing Yamaguchi’s hanger to secure a joist’s end to a frame wall.” Pet. 18–19 (citing Ex. 1003 ¶¶ 81–83; Ex. 1007, 4:47–51); *see id.* at 19–20 (discussing that although “Yamaguchi’s described setting is a sill plate,” the skilled artisan “would have been motivated to use Yamaguchi’s hanger on a wood frame wall in particular so that sheathing could be installed in the space behind the joist as taught by Bundy” (citing Ex. 1003 ¶¶ 81–82))).

Based on the foregoing and the complete record before us, we find Petitioner’s cited evidence provides sufficient rational reasons to combine Yamaguchi and Bundy to arrive at the invention of claim 1 with a reasonable expectation of success in doing so.

(4) *Undisputed Limitations*

Petitioner contends the remaining limitations of independent claim 1, namely limitations 1.P, 1.1, 1.2.A, 1.2.B, and 1.4, also would have been taught or at least fairly suggested to the skilled artisan by the combination of

Yamaguchi and Bundy. Pet. 20–25, 30–31. The Petition provides a detailed assessment of these remaining limitations, with references to disclosures in Yamaguchi and Bundy and the declaration testimony of Mr. Fennell. *See id.* (citing, *inter alia*, Ex. 1003 ¶¶ 73–92, 97–98). Patent Owner does not contend that the remaining limitations in claim 1 are absent in the combination of Yamaguchi and Bundy, except as implicated by the disputed limitations, and therefore, has waived such arguments.⁹ For the reasons set forth in the Petition (Pet. 20–25, 30–31), and based on the evidence cited therein (*see, e.g.*, Ex. 1003 ¶¶ 73–92, 97–98), we find Petitioner sufficiently establishes that the combination of Yamaguchi and Bundy teaches or fairly suggests limitations 1.P, 1.1, 1.2.A, 1.2.B, and 1.4.

(5) *Conclusion for Independent Claim 1*

For the foregoing reasons, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 1 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy.

⁹ *See* 37 C.F.R. § 42.23(a) (“Any material fact not specifically denied may be considered admitted.”); *In re Nuvasive, Inc.*, 842 F.3d 1376, 1379–82 (Fed. Cir. 2016) (holding that patent owner waived arguments on an issue that were not raised in its response after institution); *see also Papst Licensing GmbH & Co. KG v. Samsung Elecs. Am., Inc.*, 924 F.3d 1243, 1250 (Fed. Cir. 2019) (holding patent owner forfeited argument for patentability not presented to the Board); *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1048 (Fed. Cir. 2019) (explaining that arguments not presented to the Board are waived).

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d) Independent Claim 53

Petitioner contends independent claim 53 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. Pet. 31–38. The Petition provides a detailed assessment of claim 53, with references to the Petition’s analysis of claim 1, disclosures in Yamaguchi and Bundy, and the declaration testimony of Mr. Fennell. *Id.* Patent Owner argues independent claims 1 and 53 together, and does not submit separate arguments directed only to claim 53. *See, e.g.*, PO Resp. 24 n.2. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner’s contention that independent claim 1 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. For the same reasons provided above for independent claim 1, and the reasons set forth in the Petition (Pet. 31–38), we determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 53 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy.

e) Dependent Claims 2–8, 16–20, 28, 46–49, 54–60, 68–72, 80, and 99–102

Petitioner contends claims 2–8, 16–20, 28, 46–49, 54–60, 68–72, 80, and 99–102, which depend directly or indirectly from independent claims 1 or 53, would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. Pet. 38–68. The Petition provides a detailed assessment of these claims, with references to the Petition’s analysis of claims 1 and 53, disclosures in Yamaguchi and Bundy, and the declaration testimony of Mr. Fennell. *Id.* Patent Owner does not contend that any

additional limitations in these dependent claims are absent in the combination of Yamaguchi and Bundy, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *In re Nuvasive*, 842 F.3d at 1379–82; *see generally* PO Resp.; PO Sur-reply. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner’s contention that independent claims 1 and 53 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. For the same reasons provided above for independent claims 1 and 53, and the reasons set forth in the Petition (Pet. 38–68), we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claims 2–8, 16–20, 28, 46–49, 54–60, 68–72, 80, and 99–102 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy.

f) Summary

For the foregoing reasons, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi and Bundy.

2. Obviousness of Claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 over the Combinations of (1) Cullen and Bundy; and (2) Adams and Bundy

Petitioner alternatively contends claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combinations of (1) Cullen (Ex. 1039)

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and Bundy (Ex. 1007) (Pet. 6–11, 68–107 (“Ground 2”)); and (2) Adams (Ex. 1040) and Bundy (Ex. 1007) (Pet. 6–11, 107–161 (“Ground 3”)).

As discussed above in Section III.D.1, we conclude that Petitioner has demonstrated by a preponderance of the evidence that all of claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 are unpatentable under 35 U.S.C. § 103. Therefore, resolution of this proceeding does not require assessment of the foregoing additional challenges (i.e., (1) and (2) above), and so for efficiency purposes, we need not and do not herein address these challenges. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

E. PGR2023-00048

The -00048 Petition addresses claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 of the ’626 patent.

1. Obviousness of Claims 1, 39–44, 53, and 92–97 over the Combination of Yamaguchi and Bundy

Petitioner contends claims 1, 39–44, 53, and 92–97 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi (Ex. 1041) and Bundy (Ex. 1007). Pet. 10–39; Pet. Reply 5–19.

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Patent Owner opposes Petitioner's contentions. PO Resp. 21–30; PO Sur-reply 1–4. For the reasons expressed below, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 39–44, 53, and 92–97 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy.

a) Independent Claims 1 and 53

The parties dispute patentability of independent claims 1 and 53 in the -00048 PGR based on the same arguments raised against these claims in the -00047 PGR, discussed above in Section III.D. *Compare* -00048 PGR, Pet. 10–32, PO Resp. 21–30, Pet. Reply 5–19, *and* PO Sur-reply 1–4, *with* -00047 PGR, Pet. 6–11, 15–38, PO Resp. 21–30, Pet. Reply 2–19, *and* PO Sur-reply 1–4. Thus, our patentability determination in the -00048 PGR as to independent claims 1 and 53 is the same as that in the -00047 PGR, namely that Petitioner has demonstrated by a preponderance of the evidence that independent claims 1 and 53 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. *See supra* § III.D.1.

b) Dependent Claims 39–44 and 92–97

Petitioner contends claims 39–44 and 92–97, which depend directly or indirectly from independent claims 1 or 53, would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. Pet. 32–39. The Petition provides a detailed assessment of these claims, with references to the Petition's analysis of claims 1 and 53, disclosures in Yamaguchi and Bundy, and the declaration testimony of Mr. Fennell. *Id.* Patent Owner

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does not contend that any additional limitations in these dependent claims are absent in the combination of Yamaguchi and Bundy, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *In re Nuvasive*, 842 F.3d at 1379–82; *see generally* PO Resp.; PO Sur-reply. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner’s contention that independent claims 1 and 53 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. For the same reasons provided above for independent claims 1 and 53, and the reasons set forth in the Petition (Pet. 32–39), we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claims 39–44 and 92–97 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy.

c) Summary

For the foregoing reasons, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 39–44, 53, and 92–97 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi and Bundy.

2. Obviousness of Claims 22–27, 45, 50–52, 74–79, 98, and 103–105 over the Combination of Yamaguchi, Bundy, and Adams

Petitioner contends claims 22–27, 45, 50–52, 74–79, 98, and 103–105, which depend directly or indirectly from independent claims 1 or 53, would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi (Ex. 1041), Bundy (Ex. 1007), and Adams (Ex. 1040). Pet. 40–70. We turn briefly to an overview of Adams.

a) Overview of Adams

Adams generally is directed to “a joist hanger . . . for supporting a generally horizontal structural timber . . . from a load bearing wall of a building,” as shown, for example, in Figure 2, reproduced below. Ex. 1040, 1:3–8, Fig. 2.

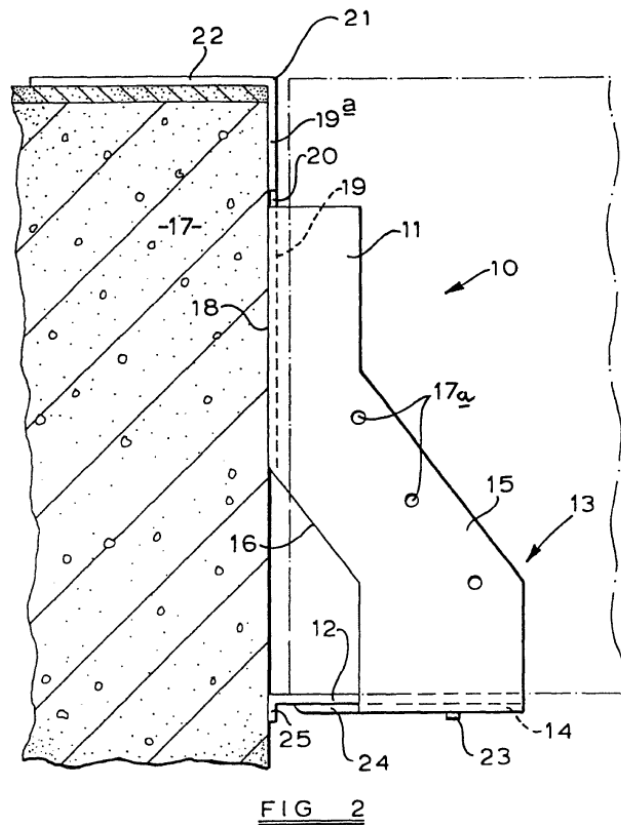


Figure 2 of Adams is a side elevational view of a joist hanger.

Id. at 3:26–27, Fig. 2.

Adams' hanger 10 includes "a stirrup part . . . which includes a base 14 and a pair of substantially upright side walls 15 spaced to form a seating for a joist"; and "an abutment portion 19 which lies against the

forward face of [the wall's] supporting element 17.” Ex. 1040, 4:2–5, 4:22–26. According to Adams, side walls 15 “extend upwardly and rearwardly . . . away from the base 14” so that “base 14 is positioned away from the supporting element 17” such that “the end of the joist can be ventilated through the opening behind the inclined edge 16 of the side walls.” *Id.* at 4:11–19.

Adams also discloses that hanger 10 may be “formed from a single sheet metal blank 11,” as shown, for example, in Figure 1, reproduced below.

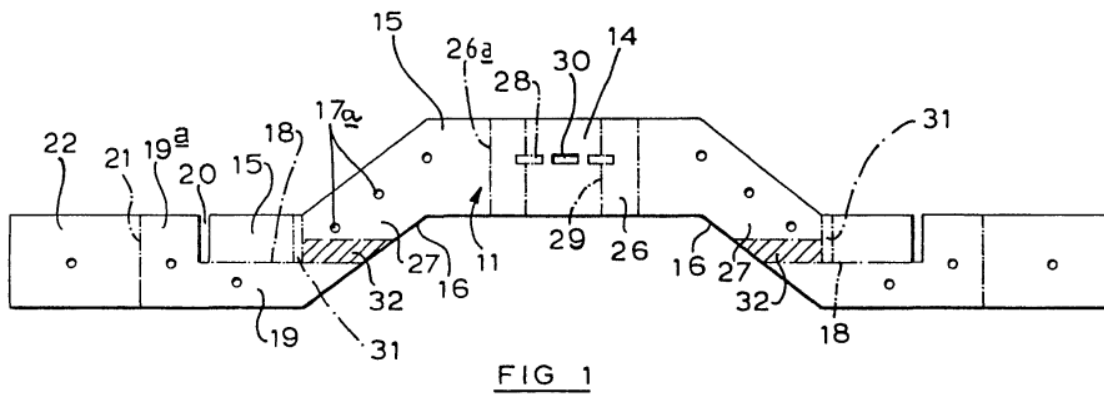


Figure 1 of Adams is a sheet metal blank from which joist hangers of various sizes may be formed.

Ex. 1040, 3:24–25, 3:55–58, Fig. 1. For purposes of the subject obviousness challenge, Petitioner relies on Adams for this teaching of forming joist hangers using one-piece of sheet metal, as discussed below.

b) Analysis: Hanger Components “Formed as One-Piece” or “Formed as One-Piece of Sheet Metal”

The Petition provides a detailed assessment of dependent claims 22–27, 45, 50–52, 74–79, 98, and 103–105, with references to the Petition’s analysis of independent claims 1 and 53, disclosures in Yamaguchi, Bundy, and Adams, and the declaration testimony of Mr. Fennell. Pet. 40–70. We turn to Petitioner’s contentions against claim 22, which depends from independent claim 1, as an example. Ex. 1001, 14:23–25; *see* Pet. 43–44. In addition to the features recited in independent claim 1, dependent claim 22, as well as dependent claims 23–27, 45, 50–52, 74–79, 98, and 103–105, recite that certain components of the hanger are formed, for example, as “one-piece of sheet metal” or “one-piece.” *See, e.g., id.* at 14:23–25 (claim 22), 14:36–38 (claim 27).

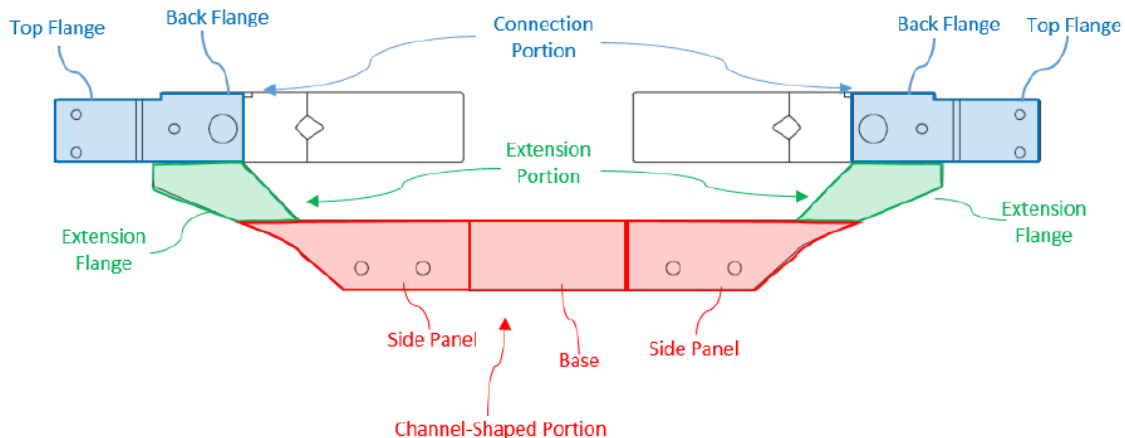
Petitioner argues persuasively:

While Yamaguchi and Bundy are silent about the hanger’s manufacturing process, Adams discloses forming a joist hanger’s extension portion (sidewalls 15 above edge 16), including its first extension flange (first sidewall 15 above edge 16), its channel-shaped portion (base 14 and portions of sidewalls 15 thereabove), and its connection portion (abutment and bearing portions 19, 22) *all as one-piece of sheet metal (blank 11)*.

Pet. 43 (emphasis added) (citing, *inter alia*, Ex. 1003 ¶¶ 129–132; Ex. 1040, 3:55–57, 6:3–22). Petitioner’s expert, Mr. Fennell, testifies that, “[e]mploying the teachings of [Adams’] manufacturing process with the Yamaguchi-Bundy hanger,” it would have been obvious to the skilled artisan to form the hanger as “one-piece of sheet metal,” as shown, for example, in

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Mr. Fennell’s rendering of a “blank” for Yamaguchi’s hanger, reproduced below. Ex. 1003 ¶ 130 (cited at Pet. 43–44).



The above illustration shows Petitioner’s expert’s rendering of a sheet metal blank for use in forming Yamaguchi’s hanger from one piece of sheet metal.

Ex. 1003 ¶ 130 (cited at Pet. 43–44); *see* Ex. 1040, 3:55–58 (disclosing that Adams’ hanger 10 may be “formed from a single sheet metal blank 11”).

Patent Owner does not contend that any additional limitations in these dependent claims are absent in the combination of Yamaguchi, Bundy, and Adams, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *In re Nuvasive*, 842 F.3d at 1379–82; *see generally* PO Resp.; PO Sur-reply.

We find Petitioner sufficiently establishes that the combination of Yamaguchi, Bundy, and Adams would have taught or fairly suggested all of the features defined by the limitations in dependent claims 22–27, 45, 50–52, 74–79, 98, and 103–105, including the claimed feature of forming particular hanger components as “one-piece” or “one-piece of sheet metal.” *See* Pet. 40–70; *infra* § III.E.2.c (reasons to combine references).

c) Reasons to Combine Teachings of Yamaguchi, Bundy, and Adams with a Reasonable Expectation of Success

Petitioner contends the skilled artisan would have had rational reasons to combine the teachings of Yamaguchi, Bundy, and Adams to arrive at the inventions of dependent claims 22–27, 45, 50–52, 74–79, 98, and 103–105 and would have had a reasonable expectation of success in doing so.

Pet. 40–42. Patent Owner does not dispute this aspect of the case (except as implicated by the disputed limitations discussed above in Section III.D.1.c). *See* PO Resp.; PO Sur-reply. We are persuaded that Petitioner’s cited evidence provides sufficient rational reasons to combine Yamaguchi, Bundy, and Adams to arrive at the inventions of dependent claims 22–27, 45, 50–52, 74–79, 98, and 103–105 for the reasons expressed below.

Petitioner argues, *inter alia*, that “[although] Yamaguchi does not explicitly disclose how its hanger is manufactured,” the skilled artisan “would have understood that Yamaguchi’s hanger may be manufactured by two alternative processes: (1) folding one piece of sheet metal, or (2) cutting and combining two pieces of metal,” and the skilled artisan “would have been motivated to manufacture Yamaguchi’s hanger by folding a single piece of sheet metal in view of Adams.” Pet. 40 (citing Ex. 1003 ¶¶ 124, 130; Ex. 1040, 3:55–58, 1:12–14). More specifically, Petitioner argues:

Adams teaches manufacturing a joist hanger “from a single sheet metal blank 11” EX1040, 3:55–58. In doing so, Adams teaches that “[a] series of blanks can be cut side-by-side from a metal sheet without substantial wastage.” EX1040, 6:2–3. [The skilled artisan] would have understood in view of Adams that forming a hanger as a single piece of sheet metal that is then bent

into shape provides the most pragmatic, economically-efficient way to manufacture a high number of hangers. EX1003, ¶125. Thus, [the skilled artisan] would have been motivated to form Yamaguchi’s hanger as one of piece of sheet metal, as taught by Adams, to yield a hanger with less wastage and manufacturing complexity. EX1003, ¶125; EX1040, 5:55–6:3.

Pet. 40–41; *see* Ex. 1040, Fig. 1.

Petitioner argues the skilled artisan would have had a reasonable expectation of success in modifying the Yamaguchi-Bundy combination as discussed above, “because Adams provides a blueprint (Figure 1) for sectioning a single of piece of metal into a hanger having a shape—specifically, a channel-shaped portion, an extension portion, and a connection portion—analogous to Yamaguchi’s hanger.” Pet. 41 (citing Ex. 1003 ¶ 126; Ex. 1040, 3:55–58, 6:4–22). Petitioner submits that the skilled artisan “would have been able to determine, using common CAD tools, how to create a single sheet blank that maintains the fundamental shape of the Yamaguchi’s hanger.” Pet. 41 (citing Ex. 1003 ¶ 127); *see id.* at 41–42 (citing Ex. 1003 ¶¶ 127–128 (Petitioner’s expert discussing how the skilled artisan would have understood to bend and weld a single sheet metal blank to form Yamaguchi’s hanger); Ex. 1040, “Usage View”).

Based on the foregoing and the complete record before us, we find Petitioner’s cited evidence provides sufficient rational reasons to combine Yamaguchi, Bundy, and Adams to arrive at the inventions of dependent claims 22–27, 45, 50–52, 74–79, 98, and 103–105 with a reasonable expectation of success in doing so.

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d) Conclusion

For the same reasons provided above for independent claims 1 and 53, and the reasons set forth in the Petition (Pet. 40–70), we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claims 22–27, 45, 50–52, 74–79, 98, and 103–105 would have been unpatentable as obvious over the combination of Yamaguchi, Bundy, and Adams.

3. Obviousness of Claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 over the Combinations of (1) Cullen and Bundy; and (2) Adams and Bundy

Petitioner alternatively contends claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combinations of (1) Cullen and Bundy (Pet. 71–121 (“Ground 3”)); and (2) Adams and Bundy (Pet. 121–182 (“Ground 4”)).

As discussed above in Sections III.E.1 and III.E.2, we conclude that Petitioner has demonstrated by a preponderance of the evidence that all of claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 are unpatentable under 35 U.S.C. § 103. Therefore, resolution of this proceeding does not require assessment of the foregoing additional challenges (i.e., (1) and (2) above), and so for efficiency purposes, we need not and do not herein address these challenges. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020)

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(non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

F. PGR2023-00049

The -00049 Petition addresses claims 1, 9–15, 21, 29–38, 53, 61–67, 73, and 81–91 of the ’626 patent.

1. Obviousness of Claims 1, 9–14, 21, 29, 30, 32–36, 38, 53, 61–66, 73, 81, 82, 84–89, and 91 over the Combination of Yamaguchi and Bundy

Petitioner contends claims 1, 9–14, 21, 29, 30, 32–36, 38, 53, 61–66, 73, 81, 82, 84–89, and 91 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi (Ex. 1041) and Bundy (Ex. 1007). Pet. 17–60; Pet. Reply 7–21, 30–31. Patent Owner opposes Petitioner’s contentions. PO Resp. 21–30, 41–43; PO Sur-reply 1–7. For the reasons expressed below, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 9–14, 21, 29, 30, 32–36, 53, 61–66, 73, 81, 82, and 84–89 (but not claims 38 and 91) would have been unpatentable as obvious over the combination of Yamaguchi and Bundy.

a) Independent Claims 1 and 53

The parties dispute patentability of independent claims 1 and 53 in the -00049 PGR based on the same arguments raised against these claims in the -00047 PGR, discussed above in Section III.D. *Compare* -00049 PGR, Pet. 17–40, PO Resp. 21–30, Pet. Reply 7–21, *and* PO Sur-reply 1–4, *with*

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-00047 PGR, Pet. 6–11, 15–38, PO Resp. 21–30, Pet. Reply 2–19, *and* PO Sur-reply 1–4. Thus, our patentability determination in the -00049 PGR as to independent claims 1 and 53 is the same as that in the -00047 PGR, namely that Petitioner has demonstrated by a preponderance of the evidence that independent claims 1 and 53 would have been unpatentable as obvious over the combination of Yamaguchi and Bundy. *See supra* § III.D.1.

b) Dependent Claims 9–14, 21, 29, 30, 32–36, 61–66, 73, 81, 82, and 84–89

The Petition provides a detailed assessment of dependent claims 9–14, 21, 29, 30, 32–36, 61–66, 73, 81, 82, and 84–89, with references to the Petition’s analysis of independent claims 1 and 53, disclosures in Yamaguchi and Bundy, and the declaration testimony of Mr. Fennell. Pet. 40–70. Generally, all of these dependent claims introduce limitations directed to the orientation of various hanger components relative to one another. *See* Ex. 1001, 13:1–29, 14:13–22, 14:53–63, 15:1–23, 15:28–33, 19:3–32, 20:17–28, 20:59–21:5, 21:10–21, 21:25–36. We turn to Petitioner’s contentions against claims 9, 13, and 30 as examples. Ex. 1001, 13:1–8, 13:16–22, 14:58–63; *see* Pet. 40–42, 49–50.

For example, (i) claims 9 and 13 require first and second extension flange planes of first and second extension flanges, respectively, to be generally perpendicular to a base plane of a channel-shaped portion and parallel to each other; and (ii) claim 30 requires a first side panel to extend upward from the base, with a front edge of the first extension flange abutting a rear edge of the first side panel. *See* Ex. 1001, 13:1–8, 13:16–22, 14:58–63. Petitioner contends, and we agree, Yamaguchi teaches the

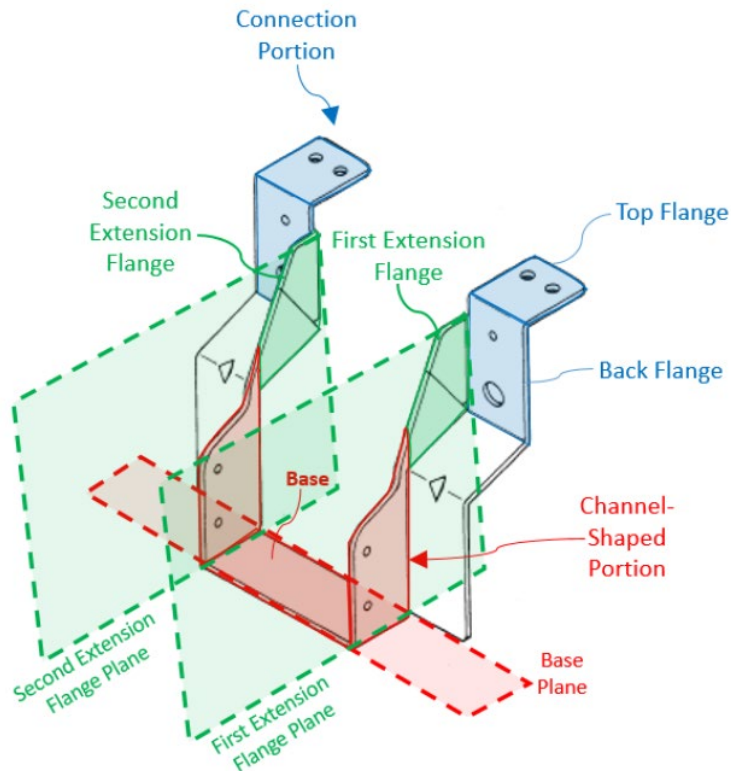
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limitations directed to the above features by disclosing a joist hanger having such features, as shown, for example, in Petitioner's annotated versions of the "Perspective" view of Yamaguchi's bracket, reproduced below.

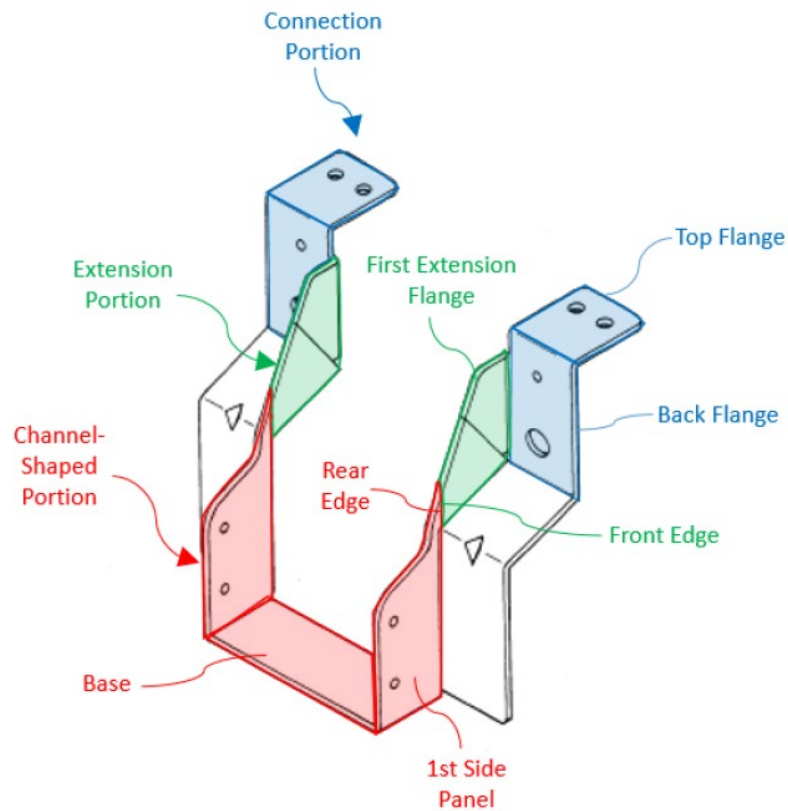
Pet. 40–42, 49–50 (citing Ex. 1003 ¶¶ 111–112, 127–128; Ex. 1041, 1–5).



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The above illustrations show the “Perspective” view of Yamaguchi’s bracket as annotated by Petitioner to show the subject features.

Ex. 1041, 2 (annotated); Pet. 40–42, 49–50. Petitioner argues persuasively that Yamaguchi teaches or at least fairly suggests all of the features defined by the limitations in dependent claims 9–14, 21, 29, 30, 32–36, 61–66, 73, 81, 82, and 84–89, including the claimed orientation relationships among hanger components (e.g., extension flange planes perpendicular to a base plane and extension flange planes parallel to one another). *See* Pet. 40–42, 49–50 (citing Ex. 1003 ¶¶ 111–112, 127–128; Ex. 1041, 1–5).

Patent Owner does not contend that any additional limitations in these dependent claims are absent in the combination of Yamaguchi and Bundy,

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and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *In re Nuvasive*, 842 F.3d at 1379–82; *see generally* PO Resp.; PO Sur-reply.

Based on the foregoing and the complete record before us, we find Petitioner sufficiently establishes that the combination of Yamaguchi and Bundy would have taught or fairly suggested all of the features defined by the limitations in dependent claims 9–14, 21, 29, 30, 32–36, 61–66, 73, 81, 82, and 84–89.

c) Dependent Claims 38 and 91

Claims 38 and 91 recite, in relevant part, a fire wall hanger wherein “the first and second extension flanges *engag[e] each other along a juncture*, the juncture arranged to be positioned within the two layers of $\frac{5}{8}$ -inch-thick drywall.” Ex. 1001, 15:28–33, 21:41–46 (emphasis added). The Specification discusses this feature in the context of Figure 2, for example, reproduced below. *See* Ex. 1001, 5:1–6, Fig. 2.

FIG. 2

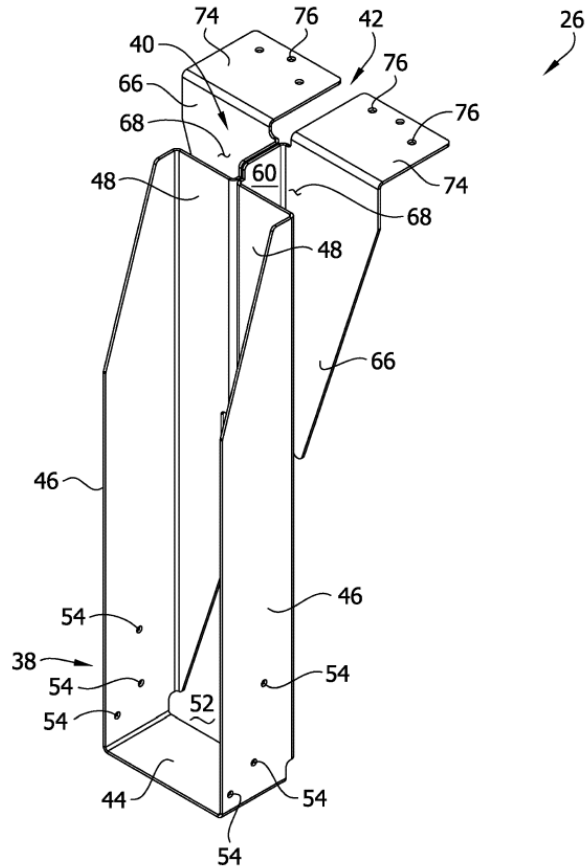


Figure 2 above depicts a perspective view of a truss hanger.

Ex. 1001, 2:59–60, Fig. 2. According to the Specification, “the extension portion 40 includes two extension flanges 60 configured to extend through the fire retardant sheathing 34. Each flange 60 extends from one of the back panels 48. *The flanges 60 are positioned in opposed, face-to-face relation, and preferably engage each other along a juncture.*” Ex. 1001, 5:1–6 (emphasis added).

In the Petition, Petitioner argues, in full:

[B]ecause Yamaguchi’s extension flanges are in an opposed, face-to-face relation and are *symmetrical to each other across a juncture* like the extension flanges shown in Figure 7 of the ’626 patent, Yamaguchi discloses the first and second extension flanges *engaging each other along a juncture*, as the term “engage” [is] used in the ’626 patent (EX1001, Abstract). EX1003, ¶¶140-141.

Pet. 59 (emphases added). In our Institution Decision, we noted that Petitioner did not explain how it is construing the limitation, “the first and second extension flanges *engaging each other along a juncture*,” and did not explain how its above conclusion comports with the Specification, which on its face appears to distinguish between (1) two extension flanges being in opposed, face-to-face relation, and (2) two extension flanges being in opposed, face-to-face relation and *engaging each other along a juncture*. Paper 7, 50–51; *see* Ex. 1001, 5:1–6. Thus, we invited the parties to provide their proposed—and supported—constructions for the subject limitation. Paper 7, 51 (“[W]e invite the parties to address the proper construction of the limitation ‘the first and second extension flanges engaging each other along a juncture.’”).

Claim Construction: “engaging each other along a juncture”

We turn first to the claim language itself. We again are mindful of Judge Rich’s guidance from over thirty years ago: in all aspects of claim construction, “the name of the game is the claim.” *In re Hiniker*, 150 F.3d at 1369. Claims 38 and 91 recite, in relevant part, a fire wall hanger wherein “the first and second extension flanges *engag[e] each other along a juncture*, the juncture arranged to be positioned within the two layers of

5/8-inch-thick drywall.” Ex. 1001, 15:28–33, 21:41–46 (emphasis added). On its face, this limitation requires not only that the first and second extension flanges “engage” each other, but also do so “along a *junction*.” This recitation of the flanges “engaging” each other along a “junction” (i.e., a place where things *join*) strongly supports interpreting the subject limitation to require physical contact (i.e., touching) at least along some portion of the flanges (such as shown in Figure 2, reproduced above). To the contrary, nothing in claims 38 or 91, or their underlying independent claims, suggests that two flanges “engaging each other along a junction” means or even includes within its scope two flanges “symmetrical to each other across a junction,” as urged by Petitioner (Pet. 59).

Patent Owner argues that “the ‘engaging each other along a junction’ limitation requires the two extension flanges to be in *touching contact with each other*,” and “[t]his is precisely what the specification supports.” PO Resp. 41–42 (emphasis added). Patent Owner submits that “[t]he specification uses the same ‘engage each other along a junction’ to describe the embodiment depicted in Figures 2–8 [Figure 2 reproduced above],” which figures show “flanges 60 in touching contact with each other.” *Id.* at 42.

Petitioner responds that Patent Owner’s proposed construction requiring “touching contact” allegedly “is improper for being inconsistent with the ’626 patent specification.” Pet. Reply 5. Petitioner argues that the Specification “does not specify that the term ‘engage’ requires contact,” and that the term “engage” is used at least in one instance in the Specification in a manner that suggests no direct contact. *Id.* at 5–7. Notably, despite our

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request to propose its own express construction for the limitation “engaging each other along a juncture,” Petitioner still does not do so. *See* PO Sur-reply 4 (“[Petitioner] still does not offer its own construction of the limitation.”). Also, Petitioner focusses only on the term “engaging” in the subject limitation, and does not address the limitation as a whole, i.e., “engaging each other *along a juncture*.” *See id.* at 5 (“[Petitioner] neglects to address the full claim limitation at issue.”). We find Petitioner’s arguments unpersuasive.

Patent Owner argues, and we agree, “in cherry-picking the usage of ‘engage’ in the Abstract, [Petitioner] neglects that ‘engage’ is used elsewhere throughout the specification to explicitly describe surface-to-surface contact,” and Patent Owner provides several examples. PO Sur-reply 5 (citing Ex. 1001, 5:44–48, 7:4–6, 6:42–43). Patent Owner also argues, and we agree, “[Petitioner] does not dispute that [the] [S]pecification uses the same ‘engage each other along a juncture’ at issue in the Claim[s] 38 and 91 to describe the embodiment depicted in Figures 7 and 8 or that Figures 7 and 8 show the first and second extension flanges (60) in touching contact with each other.” *Id.* at 6 (citing Ex. 1001: 5:1–6, Figs. 7–8). Indeed, simply looking at the figures in the Specification and its description thereof strongly supports that “engaging each other along a juncture” would require the sheet metal of the two extension flanges effectively to be formed against (or touching) each other at least along some portion thereof.

Accordingly, based on the complete record before us, we determine that “the first and second extension flanges engaging each other along a

juncture,” should be construed to mean “the first and second extension flanges physically contact (i.e., touch) each other along a juncture (i.e., along at least some portion of the extension flanges).”

Analysis

Patent Owner argues, “[w]hile the asserted prior art does teach flanges or sidewalls that are in opposed relation to each other, none of Adams, Cullen, or Yamaguchi teach that these flanges or sidewalls engage each other along a juncture.” PO Resp. 42–43; *see* PO Sur-reply 6 (Patent Owner arguing, “Adams’s, Cullen’s, and Yamaguchi’s extension flanges are spaced well apart.”). Petitioner’s arguments to the contrary depend wholly on its proposed interpretation of the term “engaging” (Pet. 58–60; Pet. Reply 30–31), which we reject, as discussed above. Although Yamaguchi (and Cullen and Adams) may teach extension flanges in *opposed, face-to-face relation*, Petitioner does not explain, let alone with particularity or persuasively, how Yamaguchi’s (or Cullen’s or Adams’) flanges, which would wind up located on opposing sides of a joist (where a joist is mounted in the hanger), also teach such extension flanges *engaging each other along a juncture*—indeed, what juncture? *See* PO Sur-reply 7 (“Beyond asserting that the word ‘engaging’—standing alone—does not require ‘touching contact,’ [Petitioner] still does not address how the extension flanges of Yamaguchi, Cullen, and Adams can be said to ‘engage’ each other.”).

Based on the foregoing and the complete record before us, we find Petitioner *does not* sufficiently establish that the combination of Yamaguchi and Bundy teaches or even fairly suggests a fire wall hanger wherein “the first and second extension flanges engag[e] each other along a juncture, the

juncture arranged to be positioned within the two layers of $\frac{5}{8}$ -inch-thick drywall,” as recited in dependent claims 38 and 91.

d) Summary

For the foregoing reasons, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 9–14, 21, 29, 30, 32–36, 53, 61–66, 73, 81, 82, and 84–89 (*but not claims 38 and 91*) would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi and Bundy.¹⁰

2. Obviousness of Claims 15, 31, 37, 67, 83, and 90 over the Combination of Yamaguchi, Bundy, and Gilb ’416

Petitioner contends dependent claims 15, 31, 37, 67, 83, and 90 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Yamaguchi (Ex. 1041), Bundy (Ex. 1007), and Gilb ’416 (Ex. 1011). Pet. 60–67. The Petition provides a detailed assessment of these dependent claims, with references to the Petition’s analysis of independent claims 1 and 53, disclosures in Yamaguchi, Bundy, and Gilb ’416, and the declaration testimony of Mr. Fennell. Pet. 60–67.

¹⁰ Petitioner also challenges patentability of dependent claims 38 and 91 based on the combination of Cullen and Bundy and the combination of Adams and Bundy. Pet. 103–105, 146–148. These challenges are based on the same arguments Petitioner made in its challenge based on the combination of Yamaguchi and Bundy, including its rejected interpretation of the term “engaging” in the context of claims 38 and 91. *See id.* Accordingly, we also conclude that Petitioner *has not* demonstrated by a preponderance of the evidence that claims 38 and 91 would have been unpatentable as obvious over the combinations of (1) Cullen and Bundy and (2) Adams and Bundy.

Dependent claims 15, 31, 37, 67, 83, and 90 recite, in relevant part, limitations requiring the joist hanger's channel-shaped portion, extension portion, and connection portion to be oriented relative to one another such that a structural member mounted in the channel-shaped portion would be oriented at a *skewed angle* relative to the wall on which the hanger is mounted (i.e., not perpendicular to the wall), as shown, for example, in Figure 36 of the '626 patent, reproduced below. *See, e.g.*, Ex. 1001, 13:30–36 (“oriented at a skewed angle”), 14:64–67 (“a bend” exists between an extension flange and channel-shaped portion), 15:24–27 (“a non-orthogonal angle”).

FIG. 36

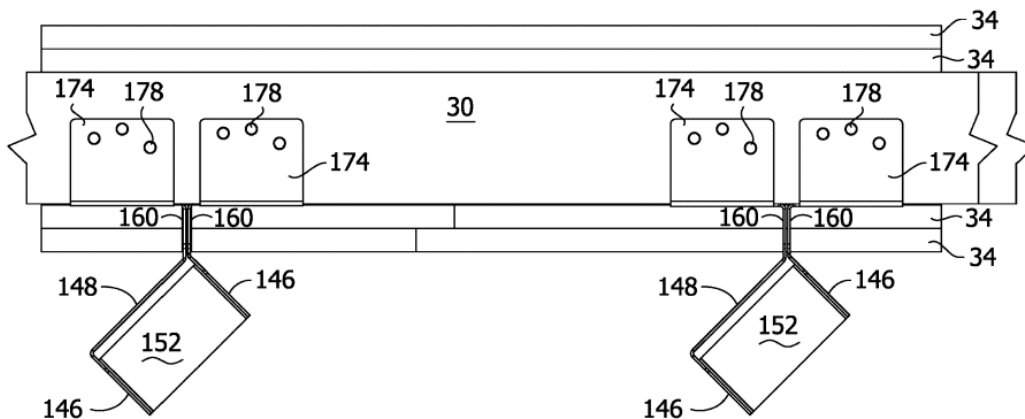


Figure 36 above depicts a truss hanger configured for mounting a floor truss in a skewed position relative to a wall.

Ex. 1001, 8:19–26, Fig. 36. According to the Specification, a truss hanger “can be configured to support the floor truss 12 at a range of different angles with respect to the wall.” *Id.* at 8:46–49; *see id.* at 8:25–26 (stating that

Petitioner argues persuasively that “[b]ending a hanger to orient its channel-shaped portion so as to mount a structural member at a non-orthogonal angle with respect to the wall was well-known, as evidenced by Gilb’416.” Pet. 61 (citing Ex. 1003 ¶ 145) (footnote omitted). Gilb’416, dating back to 1979, discloses a metal connector (i.e., a hanger) for “joining wood members which intersect at an angle less than 90 degrees,” as shown, for example, in Figure 2, reproduced below. Ex. 1011, code (57), 3:31–4:19.



Ex. 1011, 2:15–21, Fig. 2. Gilb ’416 discloses that “[w]ood framing members are often designed to intersect at a 45 degree angle,” “[m]any connectors are designed with a 45 degree angle,” and its invention “applies to all connectors with angles which are less than 90 degrees.” *Id.* at 3:10–14; *see* Ex. 1003 ¶ 147. Petitioner argues persuasively that the skilled

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artisan “would have been motivated to modify the Yamaguchi-Bundy hanger via bending such that the channel-shaped portion would be disposed at a non-orthogonal angle relative to the wall, so as to mount a skewed structural component, as taught by Gilb’416.” Pet. 63 (citing Ex. 1003 ¶ 147).

Petitioner also argues persuasively, “[g]iven that angling a framing connector was well-known,” the skilled artisan “would have had a reasonable expectation of success in such a modification, as it would have been nothing more than using a known technique (bending the connection between two metal structural portions at an angle as shown in Gilb’416) to improve similar devices (Yamaguchi’s hanger as modified by Bundy) in the same way.” Pet. 63 (citing Ex. 1003 ¶ 147).

Patent Owner does not contend that any additional limitations in these dependent claims are absent in the combination of Yamaguchi, Bundy, and Gilb ’416, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *In re Nuvasive*, 842 F.3d at 1379–82; *see generally* PO Resp.; PO Sur-reply.

We find Petitioner sufficiently establishes that the combination of Yamaguchi, Bundy, and Gilb ’416 would have taught or at least fairly suggested all of the features defined by the limitations in dependent claims 15, 31, 37, 67, 83, and 90, including the “skewed angle” feature. Thus, for the same reasons provided above for independent claims 1 and 53, and the reasons set forth in the Petition (Pet. 60–67), we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claims 15, 31, 37, 67, 83, and 90 would have been unpatentable as obvious over the combination of Yamaguchi, Bundy, and Gilb ’416.

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3. *Obviousness of (1) Claims 1, 9–15, 21, 29–38, 53, 61–67, 73, and 81–91 over the Combination of Cullen and Bundy; (2) Claims 1, 9–14, 21, 29–30, 32–36, 38, 53, 61–66, 73, 81–82, 84–89, and 91 over the Combination of Adams and Bundy; and (3) Claims 15, 31, 37, 67, 83 and 90 over the Combination of Adams, Bundy, and Gilb ’416.*

Petitioner alternatively contends (1) claims 1, 9–15, 21, 29–38, 53, 61–67, 73, and 81–91 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Cullen and Bundy (Pet. 67–105 (“Ground 3”)); (2) claims 1, 9–14, 21, 29–30, 32–36, 38, 53, 61–66, 73, 81–82, 84–89, and 91 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Adams and Bundy (Pet. 105–148 (“Ground 4”)); and (3) claims 15, 31, 37, 67, 83 and 90 would have been unpatentable under 35 U.S.C. § 103 as obvious over the combination of Adams, Bundy, and Gilb ’416 (Pet. 148–153 (“Ground 5”)).

As discussed above in Sections III.F.1 and III.F.2, we conclude that Petitioner has demonstrated by a preponderance of the evidence that (1) claims 1, 9–14, 21, 29, 30, 32–36, 53, 61–66, 73, 81, 82, and 84–89 (*but not claims 38 and 91*) would have been unpatentable as obvious over the combination of Yamaguchi and Bundy; and (2) claims 15, 31, 37, 67, 83, and 90 would have been unpatentable as obvious over the combination of Yamaguchi, Bundy, and Gilb ’416. As discussed above in Section III.F.1 (*see supra* n.10), we also conclude that Petitioner *has not* demonstrated by a preponderance of the evidence that claims 38 and 91 would have been unpatentable as obvious over the combinations of (1) Cullen and Bundy (Ground 3) and (2) Adams and Bundy (Ground 4). Therefore, resolution of

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this proceeding does not require further assessment of the foregoing additional challenges (i.e., (1), (2), and (3) above), and so for efficiency purposes, we need not and do not herein address these challenges. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

IV. CONCLUSION

Petitioner has met its burden to show, by a preponderance of the evidence, that claims 1–37, 39–90, and 92–105 (*but not claims 38 and 91*) of the ’626 patent would have been unpatentable as obvious under 35 U.S.C. § 103.¹¹

¹¹ 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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V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–37, 39–90, and 92–105 of U.S. Patent No. 11,649,626 B2 are unpatentable;

FURTHER ORDERED that claims 38 and 91 of U.S. Patent No. 11,649,626 B2 have not been shown to be unpatentable; and

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

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, 99–102	103	Yamaguchi, Bundy	1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, 99–102	
1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, 99–102	103	Cullen, Bundy ¹²		

¹² We do not reach the ground based on Cullen and Bundy as to claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 because we determined those claims would have been unpatentable as obvious over other grounds.

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Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, 99–102	103	Adams, Bundy ¹³		
1 ¹⁴ , 39–44, 53, 92–97	103	Yamaguchi, Bundy	1, 39–44, 53, 92–97	
22–27, 45, 50–52, 74–79, 98, 103–105	103	Yamaguchi, Bundy, Adams	22–27, 45, 50–52, 74–79, 98, 103–105	
1, 22–27, 39–45, 50–53, 74–79, 92–98, 103–105	103	Cullen, Bundy ¹⁵		
1, 22–27, 39–45, 50–53, 74–79, 92–98, 103–105	103	Adams, Bundy ¹⁶		

¹³ We do not reach the ground based on Adams and Bundy as to claims 1–8, 16–20, 28, 46–49, 53–60, 68–72, 80, and 99–102 because we determined those claims would have been unpatentable as obvious over other grounds.

¹⁴ Petitioner challenges the patentability of independent claims 1 and 53 on the same grounds and in the same manner across the three Petitions. We repeat those claim numbers in the challenged claim groupings in this chart to mirror the groupings across the three Petitions.

¹⁵ We do not reach the ground based on Cullen and Bundy as to claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 because we determined those claims would have been unpatentable as obvious over other grounds.

¹⁶ We do not reach the ground based on Adams and Bundy as to claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 because we determined those claims would have been unpatentable as obvious over other grounds.

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Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1 ¹⁷ , 9–14, 21, 29, 30, 32–36, 38, 53, 61–66, 73, 81, 82, 84–89, 91	103	Yamaguchi, Bundy	1, 9–14, 21, 29–30, 32–36, 53, 61–66, 73, 81–82, 84–89	38, 91
15, 31, 37, 67, 83, 90	103	Yamaguchi, Bundy, Gilb '416	15, 31, 37, 67, 83, 90	
1, 9–15, 21, 29–38, 53, 61–67, 73, 81–91	103	Cullen, Bundy ¹⁸		38, 91
1, 9–14, 21, 29, 30, 32–36, 38, 53, 61–66, 73, 81, 82, 84–89, 91	103	Adams, Bundy ¹⁹		38, 91

¹⁷ Petitioner challenges the patentability of independent claims 1 and 53 on the same grounds and in the same manner across the three Petitions. We repeat those claim numbers in the challenged claim groupings in this chart to mirror the groupings across the three Petitions.

¹⁸ We do not reach the ground based on Cullen and Bundy as to claims 1, 9–15, 21, 29–37, 53, 61–67, 73, 81–90 because we determined those claims would have been unpatentable as obvious over other grounds. We do consider claims 38 and 91 under this ground as discussed above in Section III.F.1.

¹⁹ We do not reach the ground based on Adams and Bundy as to claims 1, 9–14, 21, 29, 30, 32–36, 37, 53, 61–66, 73, 81, 82, and 84–89 because we determined those claims would have been unpatentable as obvious over other grounds. We do consider claims 38 and 91 under this ground as discussed above in Section III.F.1.

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Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
15, 31, 37, 67, 83, 90	103	Adams, Bundy, Gilb '416 ²⁰		
Overall Outcome			1–37, 39–90, 92–105	38, 91

²⁰ We do not reach the ground based on Adams, Bundy, and Gilb '416 as to claims 15, 31, 37, 67, 83, and 90 because we determined those claims would have been unpatentable as obvious over other grounds.

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