

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MRSI SYSTEMS, LLC,
Petitioner,

v.

PALOMAR TECHNOLOGIES, INC.,
Patent Owner.

Case IPR2016-00043
Patent 6,776,327 B2

Before GRACE KARAFFA OBERMANN, *Vice Chief Administrative Patent Judge*, BRIAN P. MURPHY and MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

ANKENBRAND, *Administrative Patent Judge*.

FINAL WRITTEN DECISION

Determining Claims 1–47 Not Unpatentable and Claim 48 Unpatentable
35 U.S.C. § 318(a); 37 C.F.R. § 42.73

Denying Patent Owner's Motion to Amend
37 C.F.R. § 42.121

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1–48 (collectively, “the challenged claims”) of U.S. Patent No. 6,776,327 B2 (Ex. 1001, “the ’327 patent”). We have jurisdiction under 35 U.S.C. § 6. For the reasons that follow, we determine that Petitioner demonstrates, by a preponderance of evidence, that claim 48 is unpatentable. We further determine Petitioner does not demonstrate, by a preponderance of the evidence, that claims 1–47 are unpatentable.

We also deny Patent Owner’s Motion to Amend.

A. Procedural History

MRSI Systems, LLC (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review pursuant to 35 U.S.C. § 311. On April 7, 2016, we instituted trial on six grounds of unpatentability asserted in the Petition:

- (1) Whether claims 1, 3–10, 13, and 24 of the ’327 patent are unpatentable under 35 U.S.C. § 102¹ as anticipated by Isaacs²;
- (2) Whether claims 25, 27–34, and 37 of the ’327 patent are unpatentable under 35 U.S.C. § 103 as obvious over Isaacs;
- (3) Whether claims 2, 16–18, 26, 40–42, and 48 of the ’327 patent are unpatentable under 35 U.S.C. § 103 as obvious over Isaacs and Mori³;

¹ The relevant section of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, took effect on March 16, 2013. Because the application from which the ’327 patent issued was filed before that date, our citations to Title 35 are to the pre-AIA version.

² U.S. Patent No. 5,446,960, issued September 5, 1995 (Ex. 1003, “Isaacs”).

³ U.S. Patent No. 4,878,610, issued November 7, 1989 (Ex. 1004, “Mori”).

- (4) Whether claims 11–13 and 35–37 of the '327 patent are unpatentable under 35 U.S.C. § 103 as obvious over Isaacs and Bauks⁴;
- (5) Whether claims 14, 15, 38, and 39 of the '327 patent are unpatentable under 35 U.S.C. § 103 as obvious over Isaacs, Mori, and Ginsberg⁵; and
- (6) Whether claims 19–23 and 43–47 of the '327 patent are unpatentable under 35 U.S.C. § 103 as obvious over Isaacs and Taguchi.⁶

Paper 7 (“Institution Decision” or “Inst. Dec.”).

Palomar Technologies, Inc. (“Patent Owner”) filed a Response (Paper 14, “Resp.”), and Petitioner filed a Reply (Paper 19, “Reply”). Petitioner supports its Petition with the Declaration of Dr. Stephen Derby (Ex. 1013). Patent Owner relies on the Declaration of Thomas J. Green (Ex. 2001).

Patent Owner’s fully briefed Motion to Amend also is pending. Paper 15 (“Mot. to Amend”); Paper 20 (“Resp. to Mot. to Amend”); Paper 21 (“Reply to Mot. to Amend”). The record further includes a transcript of the final oral hearing conducted on December 13, 2016. Paper 28 (“Tr.”).

B. Related Proceedings

The parties indicate that the '327 patent is the subject of a concurrent proceeding in the United States District Court for the Southern District of California: *Palomar Technologies, Inc. v. MRSI Systems, LLC*, Case No.

⁴ Daniel Z. Bauks, *Automated Hybrid-Circuit Assembly*,
6 MICROELECTRONIC MFG. & TESTING 31, 31–32 (1983) (“Bauks”) (Ex. 1006).

⁵ Gerald L. Ginsberg, *Chip & Wire Technology: The Ultimate in Surface Mounting*, 25 ELEC. PACKAGING & PROD. 78, 82–83 (1985) (“Ginsberg”) (Ex. 1005).

⁶ U.S. Patent No. 6,148,511, issued November 21, 2000 (“Taguchi”) (Ex. 1007).

3:15-cv-01484, which has been stayed through completion of this proceeding, including any appeal. Pet. 2; Paper 4, 1; Paper 16, 1.

C. The '327 Patent

The '327 patent, titled “High Accuracy Placement Method Utilizing Double Pick and Place,” issued on August 17, 2004. Ex 1001, (45), (54). The '327 patent relates to “a method for placement of a first workpiece onto a second workpiece” and “thereafter attaching the first workpiece to the second workpiece.” *Id.* at 1:53–63. The '327 patent describes the method as a “double pick and place” method. *Id.* at 1:10. The first workpiece, which in some embodiments is a semiconductor die, initially is positioned at an origination location, and the second workpiece, which in some embodiments is a circuit body, has an attach location that is different from the origination location. *Id.* at 1:63–66, 2:6–14. The method includes a first place step that “displaces” or moves the workpiece from the origination location to an intermediate location, and a second place step that displaces the first workpiece from the intermediate location to the attach location. *Id.* at 1:66–2:4. The first workpiece subsequently is attached to the second workpiece at the attach location. *Id.* at 2:4–5. The '327 patent differentiates between actual intermediate and attach locations and target intermediate and attach locations to account for error deviation in the placement steps. *See id.* at 2:27–30, 2:46–50. In one embodiment, the target intermediate location is different from the attach location and, in an alternate embodiment, the target intermediate location is identical to the attach location. *Id.* at 5:67–6:5, 11:36–43.

The '327 patent specification explains that the method can be performed repeatedly in successive cycles on succeeding first and second

workpiece pairs. *Id.* at 2:65–67. In some embodiments, both the first and second workpieces of the pair change with every cycle. *Id.* at 3:6–36. In other embodiments, the first workpiece of the pair changes with every cycle, but the second workpiece remains the same. *Id.* at 3:37–43, 12:14–25.

D. Illustrative Claims

Claims 1, 24, and 48 are independent claims of the '327 patent.

Claims 1 and 48 are illustrative of the challenged claims and recite:

1. A method for placement of a first workpiece onto a second workpiece comprising the steps of:
 - a) providing a first workpiece positioned at an origination location different from a target intermediate location;
 - b) providing a second workpiece positioned at a work location and having a target attach location different from said target intermediate location and said origination location;
 - c) performing a first place step to displace said first workpiece from said origination location to an actual intermediate location, wherein said actual intermediate location is different from said origination location and is identical to said target intermediate location or differs from said target intermediate location by an intermediate error deviation; and
 - d) performing a second place step to displace said first workpiece from said actual intermediate location to an actual attach location on said second workpiece, wherein said actual attach location is different from said origination location and said target intermediate location and is identical to said target attach location or differs from said target attach location by an attach error deviation.

Ex. 1001, 13:15–37.

48. A method for placement of a first workpiece onto a second workpiece comprising the steps of:

- a) providing a first workpiece positioned at an origination location;
- b) providing a second workpiece having an attach location different from said origination location;
- c) performing a first place step to displace said first workpiece from said origination location to an intermediate location different from said origination location and said attach location;
- d) performing a second place step to displace said first workpiece from said intermediate location to said attach location; and
- e) attaching said first workpiece to said second workpiece.

Id. at 18:27–40.

II. DISCUSSION

Petitioner bears the burden of proving unpatentability of the challenged claims, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must establish the facts supporting its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). Below, we discuss whether Petitioner has met its burden with respect to claims 1–48.

A. Level of Ordinary Skill in the Art

We begin our analysis by addressing the level of ordinary skill in the art. Petitioner and Dr. Derby describe one of ordinary skill as someone having at least a Bachelor’s degree, or equivalent experience, in mechanical engineering, electrical engineering, or a related field, and at least two years of additional experience working with tools used to fabricate electronics or

semiconductor devices. Pet. 8; Ex. 1013 ¶ 29. In reaching his opinions, Patent Owner’s expert, Mr. Green, applies Petitioner’s and Dr. Derby’s description of the ordinary artisan. Ex. 2001 ¶ 30. We adopt Petitioner’s and Dr. Derby’s description of the level of ordinary skill in the art, because it is the description that both parties have applied in this proceeding and it is consistent with the prior art of record.

B. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under that standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

The Petition sets forth three terms for construction: “first workpiece,” “error deviation,” and “carrier.”⁷ Pet. 5–8. In the Institution Decision, we determined that, based on the record at that time, no claim term required express construction. Inst. Dec. 6. The parties do not propose constructions

⁷ Petitioner notes it “has asserted that the ’327 [p]atent is invalid under 35 U.S.C. § 101” in the district court litigation and that it “offers . . . proposed claim constructions . . . despite the abstract nature of the claims of the ’327 [p]atent.” Pet. 5 n.1. Petitioner contends “[t]o the extent [its] proposed constructions are not adopted, . . . the claim terms would be indefinite.” *Id.* We take no position on the patentability of the ’327 patent claims under § 101 or § 112, second paragraph, because §§ 101 and 112 are not statutory bases upon which a petitioner may request an *inter partes* review. See 35 U.S.C. § 311(b).

for any claim terms in the Patent Owner Response or Petitioner Reply, or ask us to reconsider our determination from the Institution Decision. *See generally* Resp.; Reply. Nevertheless, to the extent that it is necessary for us to construe any claim terms in reaching this decision, we do so below in the context of analyzing whether the prior art renders the claims unpatentable. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘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))).

C. Anticipation of Claims 1, 3–10, 13, and 24 by Isaacs

Petitioner contends that Isaacs anticipates each of claims 1, 3–10, 13, and 24. Pet. 11–25. The thrust of Patent Owner’s opposition is that Isaacs does not disclose the first and second place steps, steps (c) and (d), respectively, of independent claims 1 and 24. *See, e.g.*, Resp. 27. Based on our review of the arguments and evidence of record, we determine that Petitioner does not demonstrate, by a preponderance of the evidence, that Isaacs anticipates claims 1, 3–10, 13, and 24, as explained below.

1. Isaacs

Isaacs discloses an automated alignment method and apparatus for assembling modules onto circuit boards. Ex. 1003, 1:6–8. Alignment is achieved by a pick and placement method and apparatus that picks the modules, drops or places the modules into a self-aligning nest, picks the modules from the nest, and places the modules on a printed circuit board (“PCB”). *Id.* at 2:28–32. Isaacs explains that the “specific location and orientation of the nest with respect to a [PCB] is known by the pick and placement tool” such that “[o]nce the nest has aligned the module, the tool

picks the module from the nest and places it in the appropriate location on the printed circuit board.” *Id.* at 2:33–38. The nest aligns the module in two ways: (1) the nest has slippery, sloped sides that funnel the module to the bottom of the nest to correct gross misalignment of the module, and (2) the bottom inside of the nest contains locating features into which the leads of the module fit to correct fine misalignment of the module. *Id.* at 2:38–45, 4:39–46, 4:58–52. Figure 1A of Isaacs, which depicts an embodiment of the apparatus, is reproduced below.

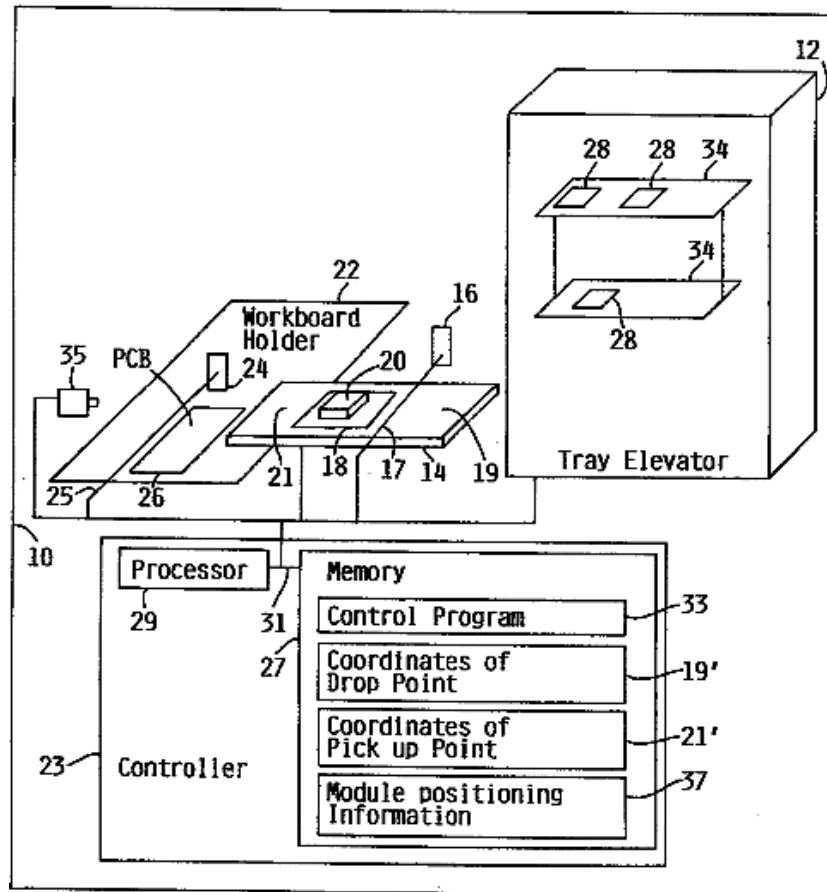


FIG. 1A

Figure 1A depicts an isometric view of a preferred embodiment of the pick and placement tool. *Id.* at 2:52–53. Tray elevator 12 holds modules 28

on a plurality of trays 34. *Id.* at 3:37–45. Transfer head 16 picks module 28 from tray 34 and drops or places module 28 into self-aligning nest 20, which properly aligns module 28 with respect to PCB 26. *Id.* at 3:44–45, 3:59–65. After module 28 is aligned, placement head 24 picks module 28 from nest 20 and accurately places module 28 on PCB 26. *Id.* at 3:66–4:18.

In Figure 1A, transfer head 16 and placement head 24 are separate, transfer arm 17 and placement arm 25 are separate, and nest 20 is affixed to shuttle 18, which, in turn, is affixed to transport 14. *Id.* at 3:56–58, 4:24–27. Isaacs explains, however, that “the shuttle and the transport are not necessary,” as the nest “could be stationary, and a single placement arm and head could have sufficient range of motion to pick the module, place it in the nest, retrieve the module from the nest and place the module on the [PCB].” *Id.* at 5:34–39.

2. Analysis

Anticipation under 35 U.S.C. § 102 requires “the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010); *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008).

a. Steps (c) and (d) of independent claims 1 and 24

Step (c) of claims 1 and 24 requires, *inter alia*, “performing a first place step to displace said first workpiece from said origination location to an actual intermediate location.” Step (d) of claims 1 and 24 requires, *inter alia*, “performing a second place step to displace said first workpiece from said actual intermediate location to an actual attach location.” According to Petitioner, Isaacs discloses those steps. Pet. 16–19. For step (c), Petitioner

points to Isaacs's teachings that: (1) “[t]ransfer head 16 picks module 28 from tray 34,” (2) “[c]ontrol program 33 moves transfer arm 17 so that transfer head 16, which now is holding module 28, is over self-aligning nest 20 at drop point 19,” and (3) “[t]ransfer head 16 drops or places module 28 into self-aligning nest 20.” *Id.* at 16–17 (citing Ex. 1003, 3:37, 3:39–45, 3:59–61). Petitioner contends that Isaacs satisfies step (c) both when the transfer head drops the module into the self-aligning nest and when the transfer head places the module into the self-aligning nest. *See* Tr. 13:14–15:3.

For step (d), Petitioner points to Isaacs's teaching that: (1) “[c]ontrol program 33 moves placement arm 25 so that **placement head 24 is positioned over pickup point 21,**” (2) “**placement head [24] picks module 28 from nest 20,**” (3) control program 33 uses camera 35 to find the precise location of PCB 26 and to sense the location and position of fiducials 36, and (4) “**control program 33 uses module positioning information 37 and the information obtained from fiducials 36 to direct placement head 24 to place module 28 in the proper position and rotation on [PCB] 26.**” *Id.* at 17–18 (citing Ex. 1003, 3:67–4:2, 4:7–9, 4:14–18, 4:20–24).

Patent Owner counters that the method disclosed in Isaacs operates in a different manner than the method recited in claims 1 and 24. Resp. 2–3, 22–24, 27–28; Ex. 2001 ¶ 47. In that regard, Patent Owner asserts Isaacs does not disclose steps (c) and (d) (i.e., the first place step and second place step) when Isaacs drops the module into the nest because the drop point in Isaacs's method is not the same as the pickup point. *Id.* at 27–28 (citing Ex. 2001 ¶¶ 46, 55). Patent Owner further contends that “there is no disclosure in Isaacs that would support a finding that Isaacs actually ‘places’

the module into an aligned position at the bottom of the nest.” *Id.* at 27 n.4. We agree with Patent Owner.

In the first place step (c) of claims 1 and 24, the workpiece is displaced to an actual intermediate location, and in the second place step (d), the workpiece is displaced from the same actual intermediate location. Ex. 1001, 13:23–25, 13:30–32. In the embodiment in which the module is dropped into the self-aligning nest, Isaacs teaches that the module is displaced to a drop point that is over or above the nest, and then dropped into the nest, which “puts module 28 into the proper alignment with respect to [PCB].” Ex. 1003, 3:59–64; *see* Ex. 2003, 110:19–112:19 (Dr. Derby’s testimony that, when dropped, the module slides down into the bottom of the nest), 117:18–118:4 (explaining that when Isaacs uses the word “dropped” it “implies there is Z axis motion”), 119:20–120:24. Thereafter, the module is picked from a pickup point (inside the nest) and placed onto the PCB. *Id.* at 3:66–4:24. In other words, when the module is dropped into the nest, the displacement location, i.e., the drop point that is above the nest, differs from the pickup location, i.e., the pickup point or the bottom of the nest. Because the drop point and pickup point of the module differ, we find that the embodiment of Isaacs that drops the module does not disclose steps (c) and (d) of claims 1 and 24.

Our inquiry does not end with that finding because, as noted previously, Petitioner also argues that Isaacs discloses steps (c) and (d) when the module is “placed” into the bottom of the nest. Petitioner further argues “Isaacs repeatedly states that the module may be placed into the bottom [of] the nest.” Reply 3 (citing Isaacs, Abstract, 2:28–30, 3:62–63). On that point, counsel for Petitioner clarifies that an ordinary artisan would

understand Isaacs's teaching that the module can be "placed" "actually means placing that module right into the bottom of the nest so that the bottom features actually fit into those locating features [on the nest], and there's no further movement at that point." Tr. 16:4–9, 17:2–3 ("Isaacs is clear that when it's placed, there's no further movement"). Dr. Derby testifies similarly. *See* Ex. 2003, 111:23–25.

The portions of Isaacs on which Petitioner relies, however, state only that the module is dropped or placed "into a self-aligning nest," and Petitioner does not direct us to any teaching that the module is placed at the bottom of the nest with no further movement (i.e., in an aligned position). *See, e.g.,* Ex. 1003, 2:28–30. Dr. Derby's testimony on that point also lacks clarity. That is, Dr. Derby testifies the module "can be placed right at the bottom [of the nest] some of the time," but also testifies that he does not know what Isaacs means by "places." *Compare* Ex. 2003, 111:23–112:1, *with id.* at 193:22–194:4 ("[T]hey [Isaacs] keep using both [drop, place] terms with the or. And personally, I would love to call them and find out what do you really mean. But apparently, they think sometimes they can place it and sometimes they can drop it. So I am taking it at their word.").

Moreover, Isaacs's disclosure is contrary to Petitioner's argument and Dr. Derby's testimony that, when Isaacs places the module, it is placed right at the bottom of the nest with no further movement. Specifically, Isaacs teaches that the self-aligning nest has four sloping sides with smooth surfaces that "act to correct gross misalignments of module 28 and to funnel module 28 to the bottom of nest 20 when module 28 is dropped or *placed* by transfer head 16." Ex. 1003, 4:40–43 (emphasis added); *see* Pet. 17 (describing the same teaching). Thus, Isaacs indicates that the module is

funneled to the bottom of the nest regardless of whether it is dropped or placed. In addition, the nest has locating features “on the inside bottom, which act to correct fine misalignment of module 28,” by further moving the module after it is dropped or placed into the nest. *Id.* at 4:43–45. The fine alignment is accomplished using the locating features and slip surfaces between the locating features that “help to cause module leads 46 to slide into locating features 44.” *Id.* at 4:62–67. Thus, we agree with Patent Owner’s assertion that “there is no disclosure in Isaacs . . . [to] support a finding that Isaacs actually ‘places’ the module into an aligned position at the bottom of the nest,” as well as Mr. Green’s declaration testimony to the same effect, which we credit. Resp. 27 n.4.; Ex. 2001 ¶¶ 37, 42 (pointing to the features of Isaacs’s nest that allow the module to drop or slide into alignment). In other words, Petitioner fails to show sufficiently one of ordinary skill in the art would understand that Isaacs discloses that the module is placed at the bottom of the nest with no further movement or alignment. Accordingly, we determine Petitioner does not establish by a preponderance of the evidence that either the dropping or placing embodiment of Isaacs discloses step (c) and step (d) of independent claims 1 and 24.

b. Dependent claims 3–10 and 13

Claims 3–10 and 13 depend, directly or indirectly, from independent claim 1. See Ex. 1001, 13:40–67, 14:9–10. Thus, the deficiencies discussed above with respect to Petitioner’s showing regarding the step (c) and step (d) limitations of independent claim 1 also apply to claims 3–10 and 13. Petitioner’s specific arguments directed to the additional limitations of those dependent claims do not cure the deficiencies. See Pet. 19–25.

3. Conclusion

Based on our review of the record arguments and evidence, and our analysis above, Petitioner does not demonstrate, by a preponderance of the evidence, that Isaacs anticipates claims 1, 3–10, 13, and 24 of the '327 patent.

D. Obviousness of Claims 25, 27–34, and 37 over Isaacs

Petitioner asserts that Isaacs, in light of the knowledge of a skilled artisan, would have rendered the subject matter of claims 25, 27–34, and 37 obvious to a person of ordinary skill in the art. Pet. 26–29. Patent Owner contends that those claims are not obvious over Isaacs because, *inter alia*, Petitioner fails to show that Isaacs discloses all of the limitations of claim 24. Resp. 36; *see id.* at 37 (reiterating argument that Isaacs's pickup and drop points are different). Based on our review of the arguments and evidence of record, we determine that Petitioner does not demonstrate, by a preponderance of the evidence, that Isaacs renders obvious the subject matter of claims 25, 27–34, and 37, as explained below.

1. Analysis

Claims 25, 27–34, and 37 depend, directly or indirectly, from claim 24. *See* Ex. 1001, 15:60–61, 15:64–16:24, 16:33–34. Thus, the deficiencies discussed above with respect to Petitioner's showing regarding the step (c) and step (d) limitations of independent claim 24 also apply to claims 25, 27–34, and 37. *See supra* § II.C.2.a. Petitioner's specific arguments directed to the additional limitations of those dependent claims do not cure the deficiencies. *See* Pet. 26–29.

In any event, had we determined that Isaacs discloses the step (c) and step (d) limitations of claim 24, we are not persuaded Petitioner shows

sufficiently that the subject matter of claims 25, 27–34, and 37 would have been obvious over Isaacs.⁸ As Petitioner notes, those claims have in common the additional requirement that the “target attach location is identical to said target intermediate location,” which means that “the first workpiece is placed in the same location where it was placed in the first step.” *Id.* at 26–27.

Petitioner does not direct us to any teaching in Isaacs of a pick and place method where the first workpiece is placed in the same location where it was placed in the first step. *See generally id.* Rather, Petitioner argues that the ordinary artisan “would have known [from Isaacs’s disclosure and the art in general] that a workpiece could have been placed in a second step where it was placed in a first step.” *Id.* at 27.⁹ Although not articulated

⁸ A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). Obviousness is resolved based on 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 ordinary skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁹ Petitioner asserts in the Reply that Patent Owner does not identify any limitation in claim 25 “purportedly missing from the prior art.” Reply 13. As explained above, it is not Patent Owner’s burden to identify limitations missing from the prior art; instead, it is Petitioner’s burden to establish that the prior art discloses the limitations of each challenged claim. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375 (Fed. Cir. 2016) (burden-shifting “does not apply in the adjudicatory context of an IPR”). Like the Petition, the Reply does not identify any teaching in Isaacs where the first

clearly in the Petition, counsel for Petitioner clarifies that, in order to repeat the place step in the same location, the ordinary artisan would have modified Isaacs to remove the self-aligning nest. Tr. 33:16–24. Petitioner asserts, and Dr. Derby testifies, that such a modification “would have involved no more than resorting to ordinary skill and common sense,” or “would have been nothing more than a routine engineering task.” Pet. 27; Ex. 1013 ¶ 91; Reply 13.¹⁰ As support, Petitioner and Dr. Derby point out that double pick and place systems, with and without nests, were known in the art. Reply 13 (citing Ex. 1003, 2:28–38; Ex. 1004, 4:9–26; Ex. 1009, 2:29–44, Ex. 1010 1:41–60, 5:25–47); Ex. 1013 ¶ 90.

Petitioner’s argument, however, lacks sufficient articulated reasoning with rational underpinnings as to why the ordinary artisan would have removed Isaacs’s nest, given the primacy of the nest for aligning the module in Isaacs’s method. *KSR*, 550 U.S. at 418; *see Magnum Oil*, 829 F.3d at 1380 (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements.”); *see also, e.g.*, Ex. 1003, 1:9–11 (“More specifically, this invention relates to properly aligning matrix leaded modules on a [PCB] using a self[-]aligning nest in a pick and placement tool.”), 2:28–32 (the objects of the invention “are achieved by a pick and placement tool that picks matrix leaded modules, drops or places the

workpiece is placed in the same location in the second place step as it was placed in the first place step. *See generally* Reply.

¹⁰ In the Reply, Petitioner cites to Mr. Green’s testimony as supporting its argument that modifying Isaacs to repeat the place step in the same location would have been a routine engineering task. Reply 13 (citing Ex. 1015, 139:11–140:6). That testimony, however, is related to workpiece attachment materials and considerations regarding the material sets used in workpiece or die attachment, not to modifying Isaacs’s nest.

modules into a self-aligning nest, picks the modules from the nest and places them on a [PCB]”). Dr. Derby’s testimony provides no additional details or objective evidence to support the proposed modification of removing Isaacs’s self-aligning nest; it simply mirrors the Petition and, therefore, is entitled to little or no weight. *Compare* Pet. 26–29, with Ex. 1013 ¶¶ 88–91; *see* 37 C.F.R. § 42.65(a).

2. Conclusion

Based on our review of the record arguments and evidence, and our analysis above, Petitioner does not demonstrate, by a preponderance of the evidence, that the subject matter of claims 25, 27–34, and 37 of the ’327 patent would have been obvious over Isaacs.

E. Obviousness of Claims 2, 16–18, 26, 40–42, and 48 over Isaacs and Mori

Petitioner asserts that the combination of Isaacs and Mori would have rendered the subject matter of claims 2, 16–18, 26, 40–42, and 48 obvious to a person of ordinary skill in the art. Pet. 29–36. Patent Owner contends that those claims are not obvious over Isaacs and Mori because, *inter alia*, Petitioner fails to show that Isaacs discloses all of the limitations of claims 1 and 24. Resp. 46. Based on our review of the arguments and evidence of record, we determine that Petitioner does not meet its burden with respect to claims 2, 16–18, 26, and 40–42, but Petitioner does meet its burden with respect to independent claim 48, as explained below.

1. Mori

Mori describes a die bonding apparatus for adhering semiconductor chips, or dies, to die mounting media, such as lead frames or ceramic substrates. Ex. 1004, 1:7–10, 3:10–11. Mori’s apparatus comprises a first conveying device that picks up a die from a wafer and conveys it to a

stocker, and a second conveying device for conveying the die in the stocker to a bonding station for attachment. *Id.* at 2:64–3:17. The second conveying device supplies the die directly to the bonding station from the stocker or, alternatively, first supplies the die to a die position correcting station to correct the angular position of the die, and then conveys the die from the correcting station to the bonding station. *Id.* at 3:14–19. The die subsequently is bonded to the workpiece using a bonding agent, such as solder or a resin adhesive. *Id.* at 3:7–13.

2. Analysis

We first address dependent claims 2, 16–18, 26, and 40–42, and then turn to independent claim 48.

a. Claims 2, 16–18, 26, and 40–42

Claims 2 and 16–18 depend, directly or indirectly, from claim 1, and claims 26 and 40–42 depend indirectly from claim 24. *See* Ex. 1001, 13:38–39, 14:21–27, 15:60–63, 16:1–4, 16:48–51. Thus, the deficiencies discussed in § II.C.2.a with respect to Petitioner’s showing regarding the step (c) and step (d) limitations of independent claims 1 and 24 also apply to claims 2, 16–18, 26, and 40–42. Petitioner’s specific arguments directed to how Mori discloses the additional limitations of those dependent claims do not cure the deficiencies. *See* Pet. 33–35. Accordingly, Petitioner does not demonstrate, by a preponderance of the evidence, that the subject matter of claims 2, 16–18, 26, and 40–42 would have been obvious over Isaacs and Mori.

b. Claim 48

Claim 48 recites a similar method to claims 1 and 24, but is broader in that first place step (c) and second place step (d) recite displacement to and from an intermediate location, as opposed to an “actual” intermediate

location. *Compare* Ex. 1001, 13:23–25 *and* 13:30–32, *with id.* at 18:33–39. Claim 48 further requires the additional step of attaching the first workpiece to the second workpiece. *Id.* at 18:40. According to Petitioner, the combined teachings of Isaacs and Mori disclose all of the limitations of claim 48. Pet. 29, 35–36. For all steps of the method, except the attachment step, Petitioner relies on the arguments presented in arguing that Isaacs anticipates claim 1. *Id.* at 35–36 (claim chart mapping Isaacs to the limitations of claim 48 “for the reasons discussed” with respect to claim 1).

For the preamble of claim 48, which recites “[a] method for placement of a first workpiece onto a second workpiece,” Petitioner directs us to Isaacs’s teaching of “an automated alignment method and apparatus for assembling modules . . . onto circuit boards.” *Id.* at 14. Petitioner contends that module 28 corresponds to the first workpiece and PCB 26 corresponds to the second workpiece. *Id.* As to steps (a) and (b), which require “providing a first workpiece positioned at an origination location” and “providing a second workpiece having an attach location different from said origination location,” Petitioner points to Isaacs’s disclosure of module 28 positioned on tray 34 (i.e., an origination location) and subsequent placement of module 28 onto PCB 26, which is at a different location than tray 34. *Id.* at 15. For step (c), Petitioner relies on its argument from claim 1 that Isaacs teaches picking the module from the tray, moving the module to the drop point, and dropping or placing the module in the self-aligning nest. *Id.* at 16–17; *see supra* § II.C.2.a. And for step (d), Petitioner again points to Isaacs’s teachings that the placement head picks the module from the nest at the pickup point, the control program uses a camera to find the location of the PCB, and the control program uses module positioning

information and information obtained from the fiducials to place the module into proper position and rotation on the PCB. Pet. 17–18; *see supra* § II.C.2.a. Finally, for step (e), which requires attaching the first workpiece to the second workpiece, Petitioner relies on Mori’s teaching of bonding a die to a workpiece using a bonding agent, such as solder or a resin adhesive. Pet. 30–31 (citing Ex. 1004, 3:7–10), 33–34 (citing Ex. 1004, 4:31–39), 36 (claim chart referring to analysis for claim 2).

Petitioner asserts that one of ordinary skill in the art would have used Mori’s attachment technique and materials in Isaacs’s placement method and apparatus because bonding one workpiece to the other would have furthered Isaacs’s objective “of ensuring that components are properly aligned.” *Id.* at 31. Petitioner further contends that the combination of teachings would merely be using known elements to yield a predictable result. *Id.*

Patent Owner does not counter Petitioner’s arguments regarding claim 48. *See generally* Resp. Nevertheless, we must determine whether Petitioner has carried its burden of showing that claim 48 is unpatentable. *See Dynamic Drinkware*, 800 F.3d at 1378. We determine that Petitioner has met that burden. Specifically, we agree with Petitioner that Isaacs and Mori disclose all of the elements of claim 48 for the reasons set forth in the Petition, which we adopt as our own. Pet. 29–36. Our determination regarding placement steps (c) and (d) of claim 48 differs from our determination regarding placement steps (c) and (d) of claim 1 because claim 48 is broader than claim 1. As noted above, claim 48 does not include the requirement that the first workpiece is displaced to and from an “actual intermediate location,” and recites only that the workpiece is displaced to and from an “intermediate location.” Because displacement to and from the

same, fixed actual intermediate location is not required, we find that claim 48 is broad enough to encompass the gross and fine adjustments made by Isaacs's self-aligning nest.

We further determine Petitioner shows sufficiently that the ordinarily skilled artisan would have combined the teachings of Isaacs and Mori to attach Isaacs's module (i.e., the first workpiece) to the PCB (i.e., the second workpiece). As Petitioner explains, both Isaacs and Mori are directed to pick and place methods and apparatus used in the fabrication of electronic and semiconductor devices. Pet. 30. Mori teaches attaching or bonding one workpiece to another with solder or resin. Ex. 1004, 3:7–13, 4:31–39. Mr. Green testifies that it was known in the art in the 1990s to attach surface mount technology, such as the ball grid array (“BGA”) module disclosed in Isaacs, onto PCBs. Ex. 2001 ¶ 23, Figs. 1, 3. In that regard, Mr. Green explains that “[r]obotic pick and place machines were developed to . . . pick the parts off of . . . trays and place them onto PCBs and into a wet solder paste. The parts were then shuttled into a reflow oven to melt the solder and attach the BGA to the PCB.” *Id.* ¶ 24; *see also* Ex. 1015, 138:25–139:25 (Mr. Green's testimony that a person of ordinary skill in the art during that time would have been “well aware” of the different attachment materials and methods, such that the material and method for attaching surface mounted devices would have been a matter of design choice).

Further, the specification of the '327 patent states that attaching one workpiece to another by soldering (as Mori teaches) was known in the art as one of a number of attachment methods. Ex. 1001, 9:1–8. “Admissions in the specification regarding the prior art are binding on the patentee for purposes of a later inquiry into obviousness.” *PharmaStem Therapeutics*,

Inc. v. ViaCell, Inc., 491 F.3d 1342, 1362 (Fed. Cir. 2007); *see Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1570 (Fed. Cir. 1988) (“A statement in a patent that something is in the prior art is binding on the . . . patentee for determinations of anticipation and obviousness.”); *In re Nomiya*, 509 F.2d 566, 571 n.5 (CCPA 1975). Given the foregoing, we determine Petitioner demonstrates that the method of claim 48 is nothing more than “the predictable use of prior art elements [from Isaacs and Mori] according to their established functions.” *KSR*, 550 U.S. at 417.

3. Conclusion

Based on our review of the record arguments and evidence, and our analysis above, Petitioner does not demonstrate, by a preponderance of the evidence that claims 2, 16–18, 26, and 40–42 would have been obvious over the combination of Isaacs and Mori. Petitioner does, however, demonstrate, by a preponderance of the evidence, that claim 48 would have been obvious over the combination of Isaacs and Mori.

F. Obviousness of Claims 11–13 and 35–37 over Isaacs and Bauks

Petitioner asserts that the combination of Isaacs and Bauks would have rendered the subject matter of claims 11–13 and 35–37 obvious to a person of ordinary skill in the art. Pet. 36–40. Claims 11–13 depend directly from claim 1, and claims 35–37 depend indirectly from claim 24. *See* Ex. 1001, 14:1–10, 15:60–61, 16:25–34. Thus, the deficiencies discussed in § II.C.2.a with respect to Petitioner’s showing regarding the step (c) and step (d) limitations of independent claims 1 and 24 also apply to claims 11–13 and 35–37. Petitioner’s specific arguments directed to how Bauks discloses the additional limitations of those dependent claims do not cure the deficiencies. *See* Pet. 39–40. Accordingly, Petitioner does not

demonstrate, by a preponderance of the evidence, that the subject matter of claims 11–13 and 35–37 would have been obvious over Isaacs and Bauks.

*G. Obviousness of Claims 14, 15, 38, and 39
over Isaacs, Mori, and Ginsberg*

Petitioner asserts that the combination of Isaacs, Mori, and Ginsberg would have rendered the subject matter of claims 14, 15, 38, and 39 obvious to a person of ordinary skill in the art. Pet. 40–45. Claims 14 and 15 depend indirectly from claim 1, and claims 38 and 39 depend indirectly from claim 24. See Ex. 1001, 13:38–39, 14:11–20, 15:60–61, 15:64–67, 16:35–44.

Thus, the deficiencies discussed in § II.C.2.a with respect to Petitioner’s showing regarding the step (c) and step (d) limitations of independent claims 1 and 24 also apply to claims 14, 15, 38, and 39. Petitioner’s specific arguments directed to how Mori and Ginsberg disclose the additional limitations of those dependent claims do not cure the deficiencies. See Pet. 43–45. Accordingly, Petitioner does not demonstrate, by a preponderance of the evidence, that the subject matter of claims 14, 15, 38, and 39 would have been obvious over Isaacs, Mori, and Ginsberg.

H. Obviousness of Claims 19–23 and 43–47 over Isaacs and Taguchi

Petitioner asserts that the combination of Isaacs and Taguchi would have rendered the subject matter of claims 19–23 and 43–47 obvious to a person of ordinary skill in the art. Pet. 45–60. Claims 19–23 depend, directly or indirectly, from claim 1, and claims 43–47 depend indirectly from claim 24. See Ex. 1001, 14:28–15:40, 15:60–61, 16:52–18:26. Thus, the deficiencies discussed in § II.C.2.a with respect to Petitioner’s showing regarding the step (c) and step (d) limitations of independent claims 1 and 24 also apply to claims 19–23 and 43–47. Petitioner’s specific arguments directed to how Taguchi discloses the additional limitations of those

dependent claims do not cure the deficiencies. *See* Pet. 48–60.

Accordingly, Petitioner does not demonstrate, by a preponderance of the evidence, that the subject matter of claims 19–23 and 43–47 would have been obvious over Isaacs and Taguchi.

III. MOTION TO AMEND

Patent Owner filed a Motion to Amend cancelling claims 4, 21, and 48, and proposing to substitute claim 49 for claim 4, claim 50 for claim 48, and claim 51 for claim 21. Mot. to Amend 1–2; Ex. 2004, 8–9¹¹ (listing claims 49–51 as substitute claims). As we advised Patent Owner in our conference, prior to filing its Motion to Amend, “[a] request to substitute claims is contingent” and will be considered only if we determine that the original claim it replaces is unpatentable. Paper 13, 2. Accordingly, we construe Patent Owner’s motion as a contingent motion to amend. Because we determine that Petitioner does not demonstrate that claims 4 and 21 are unpatentable, we address below Patent Owner’s motion only as to claim 48 (i.e., proposed substitute claim 50).

A. Proposed Substitute Claim 50

Patent Owner proposes to substitute claim 50 for claim 48. Mot. to Amend 2; Ex. 2004, 8. Proposed substitute claim 50 is reproduced below,

¹¹ Patent Owner does not include page numbers on Exhibit 2004. For clarity, we number the pages beginning with the first full page of text, titled “Amended Claim Set for US 6,776,327” (“amended claim set”).

with double brackets showing the subject matter deleted from claim 48 and underlining showing the subject matter added to claim 48.¹²

50. A [[method for]] high-accuracy placement system for precision placement of a [[first]] workpiece onto another [[a second]] workpiece, comprising [[the steps of]]:

[[a) providing]] a first workpiece located on a support positioned at an origination location different from a target intermediate location;

[[b) providing]] a second workpiece positioned at a work surface and having a target [[an]] attach location different from said target intermediate location and said origination location; at least one sensor configured to obtain reference coordinates of said origination location, said target intermediate location, said target attach location, said first workpiece, and said second workpiece;

at least one pickup tool configured to

[[c) performing a first place step to]] engage said first workpiece at said origination location, displace said first workpiece from said origination location to an actual intermediate location [[different from said origination location and said attach location]], and disengage from said first workpiece at said actual intermediate location, wherein said actual intermediate location is different from said origination location and is identical to said target intermediate location or

¹² Patent Owner did not provide a listing for its proposed substitute claims “show[ing] the changes clearly,” as required by 37 C.F.R. § 42.121(b). Accordingly, we create the reproduction of proposed claim 50. We note that Patent Owner’s listing of proposed claim 50 in the amended claim set is different than the listing Patent Owner provides in the motion to amend, as the listing in the amended claim set does not include the “wherein” clause for either of the “engage” limitations. *Compare* Mot. to Amend 6, *with* Ex. 2004, 9. For purposes of our decision, we incorporate the “wherein” clauses into proposed claim 50 below. Our decision would not change, however, if we excluded those clauses from the proposed substitute claim.

differs from said target intermediate location by an intermediate error deviation, and

[[d) performing a second place step to]] engage said first workpiece at said actual intermediate location, displace said first workpiece from said actual intermediate location to an actual [[said]] attach location, and disengage from said first workpiece at said actual attach location, wherein said actual attach location is different from said origination location and said target intermediate location and is identical to said target attach location or differs from said target attach location by an attach error deviation;

[[e) attaching said first workpiece to said second workpiece]] a process controller configured to utilize said at least one sensor to determine an intermediate error deviation between said target intermediate location and said first workpiece at said actual intermediate location, and to correct for said intermediate error deviation when said first workpiece is displaced from said actual intermediate location to said actual attach location.

Notably, proposed substitute claim 50 changes the claim from a method claim to a system claim. In that regard, proposed substitute claim 50 also deletes the following limitations from claim 48: “performing a first place step,” “performing a second place step,” and “attaching said first workpiece to said second workpiece.”

B. Analysis

The Board may deny a motion to amend if the amendment “seeks to enlarge the scope of the claims of the patent.” 37 C.F.R. § 42.121(a)(2)(i)–(ii); see 35 U.S.C. § 316(d)(3) (an amendment “may not enlarge the scope of the claims of the patent”). We have explained that “[a] proper substitute claim under 37 C.F.R. § 42.121(a)(2)(i) must only narrow the scope of the challenged claim it replaces. Similarly, under 37 C.F.R. § 42.121(a)(2)(ii), a substitute claim may not enlarge the scope of the challenged claim it

replaces by eliminating any feature.” *Idle Free Systems, Inc. v. Bergstrom, Inc.*, Case IPR2012-00027, slip op. at 5 (PTAB June 11, 2013) (Paper 26) (“*Idle Free*”).

Petitioner argues that proposed substitute claim 50 substantially rewrites claim 48 and eliminates certain requirements of that claim. Opp. to Mot. to Amend 4–6. Patent Owner does not contest Petitioner’s argument, but responds that proposed substitute claim 50 is narrower than original claim 1 of the ’327 patent. Reply to Mot. to Amend 3; see Tr. 92:8–9. Patent Owner further argues that claim 50 is a “new claim,” which “does not require repeating the elements of a canceled claim.” Reply to Mot. to Amend 3 n.3 (citing Office Patent Trial Practice Guide (“Trial Practice Guide”), 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012)).

Patent Owner’s argument that proposed substitute claim 50 is a “new claim” is inconsistent with the language of 35 U.S.C. § 316(d), which requires that a motion to amend “[c]ancel any challenged patent claim” and/or “[f]or each challenged claim, propose a reasonable number of substitute claims.” 35 U.S.C. § 316(d)(1)(A)–(B). Likewise, Patent Owner’s argument that proposed substitute claim 50 is narrower than claim 1, an argument made for the first time in the Reply to the Motion to Amend, does not comport with the guidance set forth in the Board’s *Idle Free* decision that a proposed substitute claim must narrow the scope of the challenged claim it replaces. *Idle Free*, Paper 26, 5; see *Master Image 3D, Inc. v. RealD Inc.*, Case IPR2015-00040, slip op. at 2, 4 (PTAB July 15, 2015) (Paper 42) (Precedential).

Proposed substitute claim 50 is of a different claim type than original claim 48, i.e., a system as opposed to a method, and effectively eliminates

the requirements of “performing a first place step” and “performing a second place step.” As Petitioner points out, although the added “pickup tool” limitation must be “**configured to**” engage and displace the first workpiece, it is not required to carry out any place steps. Opp. to Mot. to Amend 6. Further, proposed substitute claim 50 eliminates completely the attachment requirement in original claim 48. That is, nothing in proposed substitute claim 50 requires “attaching said first workpiece to said second workpiece.” Given the foregoing, we determine that, regardless of which party bears the burden of persuasion on a motion to amend, proposed substitute claim 50 enlarges the scope of the claims of the patent, contrary to the requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121(a)(2). Accordingly, we deny Patent Owner’s Motion to Amend.

Patent Owner requests leave to file a second motion to amend, should we disagree with its interpretation of the rules governing motions to amend. Reply to Mot. to Amend 3 n.3. In that regard, Patent Owner argues that its “justifiable reliance” on several authorities directed to reissue applications, and the amended claim set example provided in the Trial Practice Guide, demonstrates the good cause necessary for a second motion to amend. *Id.* We disagree. First, unlike a reissue application, an *inter partes* review is more adjudicatory than examinational in nature. Thus, the two types of Patent Office proceedings are governed by different statutes and regulations. Patent Owner’s reliance on authorities directed to reissue applications, therefore, is misplaced.

We also do not agree with Patent Owner’s interpretation of the Trial Practice Guide. In the Trial Practice Guide example, proposed claim 7 depends from a proposed substitute claim that includes all of the limitations

of several original claims. See Trial Practice Guide 77 Fed. Reg. at 48,767. Here, as noted above, Patent Owner's proposed substitute claim 50 deletes several limitations of claim 48, and those limitations are not incorporated into another proposed substitute claim.

In any event, we issued orders in this proceeding directing Patent Owner to, *inter alia*, review the *Idle Free* decision for clarification regarding the requirements for a motion to amend. See Paper 11, 2; Paper 13, 5. Patent Owner confirms that it reviewed the *Idle Free* decision, and Patent Owner's Motion to Amend states that it complies with that decision. See Mot. to Amend 1. Patent Owner's Motion to Amend, however, does not adhere to the guidance provided in *Idle Free* because the motion fails to explain why proposed substitute claim 50 does not enlarge the scope of claim 48. See generally Mot. to Amend. Patent Owner, therefore, does not show good cause to file a second motion to amend.

IV. CONCLUSION

Taking account of the arguments and evidence presented during trial, Petitioner demonstrates, by a preponderance of the evidence, that claim 48 is unpatentable under 35 U.S.C. § 103. Petitioner fails to demonstrate, by a preponderance of the evidence, that claims 1, 3–10, 13, and 24 are unpatentable under 35 U.S.C. § 102, or that claims 2, 11–23, and 25–47 are unpatentable under 35 U.S.C. § 103. We deny Patent Owner's Motion to Amend because proposed substitute claim 50 enlarges the scope of claim 48 of the patent.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner does not establish, by a preponderance of the evidence, that claims 1–47 of the '327 patent are unpatentable;

FURTHER ORDERED that Petitioner establishes, by a preponderance of the evidence, that claim 48 of the '327 patent is unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied*;

FURTHER ORDERED that Patent Owner's request to file a second motion to amend is *denied*; and

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

IPR2016-00043
Patent 6,776,327 B2

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