

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FMC TECHNOLOGIES, INC.,
Petitioner,

v.

ONESUBSEA IP UK LIMITED,
Patent Owner.

Case IPR2016-00495
Patent 8,066,076 B2

Before JOSIAH C. COCKS, CARL M. DEFRANCO, and
MICHELLE N. WORMMEESTER, *Administrative Patent Judges*.

WORMMEESTER, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

FMC Technologies, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–3 and 6–9 of U.S. Patent No. 8,066,076 B2 (Ex. 1001, “the ’076 patent”). We instituted an *inter partes* review of all the challenged claims because Petitioner demonstrated a “reasonable likelihood” of prevailing on “at least 1 of the claims challenged in the petition.” Paper 7 (“Inst. Dec.”); *see* 35 U.S.C. § 314(a).

After institution of trial, OneSubsea IP UK Limited (“Patent Owner”) filed a Patent Owner Response (Paper 12, “PO Response”), and Petitioner filed a Reply (Paper 17, “Pet. Reply”). With our authorization, Patent Owner subsequently filed a Sur-Reply (Paper 23, “PO Sur-Reply”). We conducted an oral hearing on March 29, 2017, and a copy of the transcript is included in the record (Paper 27, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6(b). For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–3 and 6–9 of the ’076 patent are unpatentable. This final written decision is issued pursuant to 35 U.S.C. § 318(a).

II. BACKGROUND

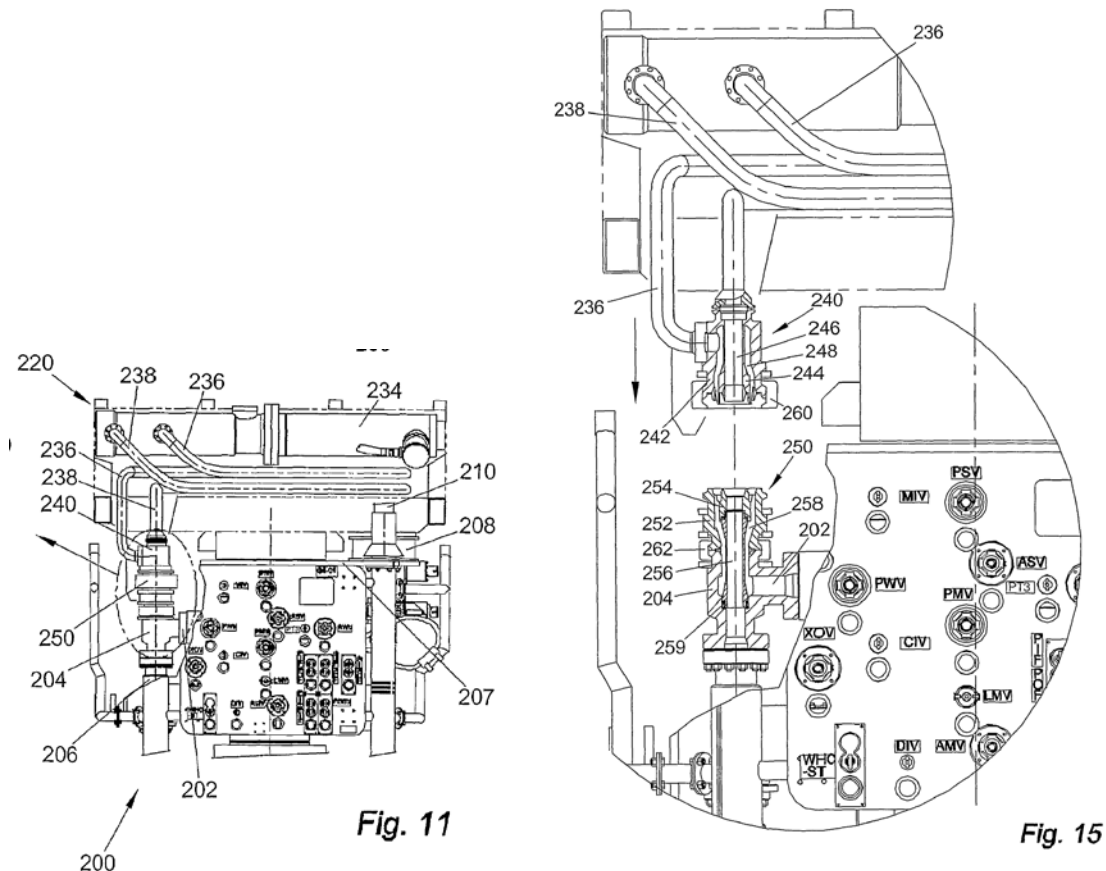
A. *Related Proceedings*

The parties identify the following federal district court case involving the ’076 patent: *OneSubsea IP UK Limited v. FMC Technologies, Inc.*, Case No. 4:16-cv-00051 (S.D. Tex. Jan 7, 2016). Pet. 1; Paper 5, 1.

B. The '076 Patent

The '076 patent is titled “Connection System for Subsea Flow Interface Equipment.” Ex. 1001, at [54]. A subsea production facility typically has a “Christmas tree” with associated equipment. *Id.* at 1:33–34. With such typical trees, however, fluids leaving the well are neither boosted nor processed. *Id.* at 1:39–41. The tree assembly of the '076 patent includes a processing apparatus that “allows well fluids to be processed (e.g. pressure boosted/injected with chemicals) at the wellhead before being delivered to the outlet flowline of the well.” *Id.* at 2:12–15.

The tree assembly of the '076 patent further includes a Christmas tree and a skid. *Id.* at 11:20–21, 28–29. Figures 11 and 15 of the '076 patent are reproduced below.



Figures 11 and 15 show, respectively, side and partial views of a tree assembly according to one embodiment of the '076 patent. *Id.* at 6:60–61, 65–67. Processing apparatus (or pump) 234 is mounted on frame (or skid) 220. *Id.* at 11:43–44; Fig. 11. The pump has an inlet to which one end of conduit 238 is connected, and an outlet to which one end of conduit 236 is connected. *Id.* at 11:44–46. The other end of conduit 236 connects to an inlet of piping interface 240 located at annulus 248, while the other end of conduit 238 connects to an outlet of the piping interface located at cylindrical bore 246. *Id.* at 12:29–33, Fig. 15.

Skid 220 is located on Christmas tree 200. *Id.* at Fig. 11. To align the skid and the tree, the skid's legs 232 engage with the tree's feet 208, and the skid's guide funnels 230 receive the tree's guide legs 210. *Id.* at 11:37–42.

The tree has production wing branch 202, choke body 204, and a flowpath leading to production wing outlet 206. *Id.* at 11:21–23. Secondary conduit 250 is connected to the choke body. *Id.* at 12:21–22. The secondary conduit has cylindrical bore 256 and annulus 258, which engage cylindrical bore 246 and annulus 248 of piping interface 240. *Id.* at 12:42–47. With this arrangement, cylindrical bores 246, 256 form a first flowpath that connects conduit 238 to production wing outlet 206, and annuli 248, 258 form a second flowpath that connects production wing branch 202 to conduit 236. *Id.* at 12:47–52. That is, fluids recovered from the well are carried via the first flowpath from the choke body to the pump, processed (e.g., pressure boosting) at the pump, and then returned to the choke body via the second flowpath for recovery through the production wing branch. *Id.* at 4:35–38, 48–52.

C. Illustrative Claim

Claims 1 and 6 are independent claims. Each of claims 2, 3, and 7–9 depends from one of claims 1 and 6. Claim 1 is illustrative of the subject matter at issue, and is reproduced below.

1. A production tree including:
 - a tree body including:
 - a production bore and a lateral production port extending from the bore into a wing block in a first flowpath, the wing block having an upwardly facing vertical bore; and
 - a tree guide; and
 - a utility skid landable on and supportable by the tree, the skid including:
 - a frame including a body;
 - a processing apparatus supportable by the frame;
 - a conduit that is received by the upwardly facing vertical bore and allows fluid communication in a second flowpath between the production bore, the processing apparatus, and the wing block, the second flowpath being external of and not forming a portion of the frame body; and
 - an aligning member that is engageable with the tree guide to align the utility skid with respect to the tree.

D. The Instituted Grounds

Petitioner asserts in its Petition various grounds that include anticipation under 35 U.S.C. § 102 and obviousness under 35 U.S.C. § 103. Pet. 3. We instituted *inter partes* review on all the challenged claims, but we did not institute such review on all the asserted grounds. Inst. Dec. 6. The instituted grounds are as follows.

Reference(s)	Basis	Claims Challenged
Kelly ¹	§ 102	1–3
Kelly and Andersen ²	§ 103	1–3
Andersen	§ 102	1, 3, and 6–9
Andersen, Hopper, ³ and Kelly	§ 103	1, 3, and 6–9

In support of the instituted grounds, Petitioner proffers the declaration of Robert Herrmann (Ex. 1003).

III. ANALYSIS

A. APA Due Process

We instituted *inter partes* review of the challenged claims because, pursuant to 35 U.S.C. § 314(a), Petitioner demonstrated a “reasonable likelihood” of proving that “at least 1 of the claims challenged in the petition,” namely, claim 1, is unpatentable. Inst. Dec. 9–10, 13–14. After deciding that claim 1 met the threshold for institution, we exercised our discretion under 37 C.F.R. § 42.108(b) to institute on *all* the challenged claims. *Id.* (citing *Intex Recreation Corp. v. Bestway Inflatables & Material Corp.*, IPR2016-00180, Paper 13, at 8–11 (PTAB Jun. 6, 2016)).

Patent Owner argues that we overstepped our statutory authority and violated its due process rights “[b]y failing to perform a claim-by-claim analysis” for all the claims in our institution decision and by failing to provide it “with notice of the facts and arguments” in support thereof. PO Resp. 78–81. Citing 35 U.S.C. § 314, Patent Owner argues that “[t]he Board

¹ Kelly, U.S. Patent No. 4,589,493, issued May 20, 1986 (Ex. 1004).

² Andersen, Int’l Publ’n No. WO 00/47864 A1, published Aug. 17, 2000 (Ex. 1005).

³ Hopper, U.S. Patent No. 5,544,707, issued Aug. 13, 1996 (Ex. 1006).

is required to first determine that there is a reasonable likelihood that the petitioner will prevail with respect to *the claims* being challenged” before instituting an *inter partes* review. *Id.* at 80 (emphasis added). We disagree.

Patent Owner fails to recognize the critical language of the statute. The statute does not require that the threshold for institution must be met for “the claims,” as Patent Owner urges. Instead, the statute requires simply that the threshold must be met with respect to “*at least 1* of the claims challenged in the petition.” 35 U.S.C. § 314(a) (emphasis added). Thus, contrary to what Patent Owner argues, we did not need to analyze all the challenged claims individually, for the statutory threshold need only be applied to one claim, not all the claims.

Nor did we need to analyze all the asserted grounds individually, for, again, the statute requires simply that one claim “in the petition” meet the threshold, not one claim in each ground. *Id.* Indeed, section 314(a) of the statute omits the term “ground” altogether, despite its express mention in preceding sections of the statute. *See, e.g.*, 35 U.S.C. § 311(b) (“a petitioner . . . may request to cancel . . . claims of a patent only on a *ground* that could be raised under section 102 or 103”) (emphasis added); 35 U.S.C. § 312(a) (“A petition . . . may be considered only if— . . . the petition identifies . . . *the grounds* on which the challenge to each claim is based.”) (emphasis added). That clear omission of the term “ground” from section 314(a) supports that the threshold for institution need only be met for one claim in the petition, not one claim in each ground. As such, our substantive analysis of only one of the challenged claims as a precursor to exercising our discretion to institute on all the challenged claims satisfies our statutory

obligation of determining a reasonable likelihood for “at least 1 of the claims challenged in the petition.”

Our discretionary decision to institute on all the challenged claims after analyzing only one of those claims is also consistent with our regulatory authority. For instance, 37 C.F.R. § 42.108(c) tracks the language of the statute and precludes institution on “a ground of unpatentability unless the Board decides that *the petition* supporting the ground would demonstrate that there is a reasonable likelihood that at least one of the claims challenged in *the petition* is unpatentable.” (Emphasis added.) Like 35 U.S.C. § 314(a), the purpose of that rule is simple—it sets a minimum threshold for exercising our discretion to institute an *inter partes* review. While subsections (a) and (b) of the rule permit us discretion to institute on “all or some” of the claims and grounds, subsection (c) limits that discretion by requiring that “at least one claim in the petition” satisfy the “reasonable likelihood” standard. In other words, the rule is permissive—it does not state that we *must* address the merits of each challenged claim and asserted ground, only that we do so for at least one claim in *the petition*.

Had the rule meant to invoke a more stringent requirement that one claim *in each ground* meet the threshold, the rule would have omitted reference to “the petition” and, instead, required “*the ground* would demonstrate that there is a reasonable likelihood” and “one of the claims challenged in *the ground* is unpatentable.” It does not. An interpretation that emphasizes mention of “the ground” over “the petition,” in essence, reduces the latter term to nothing more than unnecessary surplus verbiage.

We cannot interpret our rules in a manner that renders words meaningless.⁴ As such, 37 C.F.R. § 108(c) is best understood to require that at least one claim in the petition meet the minimum threshold, not one claim in each asserted ground.

In exercising our discretion under 37 C.F.R. § 42.108, we grouped the grounds in the Petition along the lines of where we perceived a significant overlap or meaningful distinction in terms of the references relied upon. *Cf. Shaw Indus. Grp., Inc. v. Automated Creel Sys., Inc.*, 817 F.3d 1293, 1298–99 (Fed. Cir. 2016) (expressing concern with the Board’s exercise of discretion where it “made no specific findings that the three grounds overlapped with one another”). We found that some grounds overlapped significantly in terms of the primary reference relied upon, while other grounds differed sufficiently despite some overlap of secondary references. Specifically, we divided the grounds into two groups—(1) the “Kelly-based grounds,” where the grounds overlap with Kelly as the primary reference, and (2) the “Andersen-based grounds,” where the grounds overlap with Andersen as the primary reference. Inst. Dec. 6, 11. We denied review of claims 6, 7, and 9 as challenged in one of the Kelly-based grounds because Petitioner failed to comply with our requirements under 37 C.F.R. § 42.104(b) for those claims. *Id.* at 10. We also analyzed the merits of claim 1—as challenged in the Kelly-based grounds, (*id.* at 6–9), and as challenged in the Andersen-based grounds, (*id.* at 11–14)—and found that it met the “reasonable likelihood” standard for institution.

⁴ Each word must have meaning and purpose. An interpretation that would render a word in our rules redundant or meaningless is rarely, if ever, correct.

Upon determining that claim 1 as challenged in each group met the statutory threshold, we then explained our reason for exercising discretion to institute on all the remaining claims under challenge—to achieve consistency and efficiency between the related district court action and the instant proceeding. *See id.* at 9–10, 13–14; *cf. Shaw Indus.*, 817 F.3d at 1304 (concurring op.) (expressing concern that the Board’s institution decision “say[s] nothing about efficiency” as rationale for exercising discretion); *see also Synopsys, Inc. v. Mentor Graphics Corp.*, 814 F.3d 1309, 1325 (Fed. Cir. 2016) (dissenting op.) (expressing concern that partial institution “negates the AIA’s purpose of providing an alternative and efficient forum for resolving patent validity issues”). We further explained that “concerns of fairness and efficiency in this case” persuade us to institute on grounds of anticipation *and* obviousness that rely primarily on Kelly or Andersen as a basis of the challenge. Inst. Dec. 10 (citing *HP Inc. v. MPHJ Tech. Inv., LLC*, 817 F.3d 1339, 1347 (Fed. Cir. 2016) (holding that petitioner was “not estopped from raising the obviousness of claim 13 in a subsequent court or Board proceeding” where Board instituted only on grounds of anticipation of claim 13)); *see also id.* at 14.

An analysis of each and every claim, and each and every ground, in the petition is not a prerequisite to institution. *See Genzyme Therapeutic Prods. Ltd. v. Biomarin Pharm. Inc.*, 825 F.3d 1360, 1366 (Fed. Cir. 2016) (“There is no requirement, either in the Board’s regulations, in the APA, or as a matter of due process, for the institution decision to anticipate and set forth every legal or factual issue that might arise in the course of the trial.”) (citing *Boston Carrier, Inc. v. ICC*, 746 F.2d 1555, 1560 (D.C. Cir. 1984) (quotation omitted)). In granting institution, we addressed Petitioner’s first

ground and explained why Kelly sufficed as proof of a reasonable likelihood of anticipation of claim 1. Inst. Dec. 6–9. And, because that first ground overlapped significantly with Petitioner’s other ground relying primarily on Kelly, we exercised our discretion under 37 C.F.R. § 42.108 to institute on *all* claims challenged within those grounds (that we did not already deny), namely, claims 1–3. *Id.* at 9–10. Similarly, with respect to Petitioner’s last ground, we explained how Andersen sufficed to show a reasonable likelihood of anticipation with respect to claim 1, and again exercised our discretion to review all the claims challenged within that ground as well as the overlapping ground relying primarily on Andersen, namely, claims 1–3 and 6–9. *Id.* at 11–14. Our decision to streamline the institution proceeding by analyzing substantively only one of the challenged claims is fully within our statutory and regulatory authority, as discussed above, and, thus, is reasonable.

Moreover, our institution decision provided the parties with full notice of “the matters of fact and law asserted” to permit them “to submit rebuttal evidence, and to conduct such cross-examination as may be required for a full disclosure of the facts.” *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015) (citations omitted). The Board is not precluded from “relying on arguments made by a party and doing its job, as adjudicator, of drawing its own inferences and conclusions from those arguments . . . *subject, of course, to the provision of adequate notice and opportunity to be heard.*” *Roalma, S.A. v. Bohler-Edelstahl GmbH & Co. KG*, Appeal No. 2016-2233, slip op. at 14 (Fed. Cir. May 11, 2017) (emphasis added). In the preliminary proceeding, we considered the parties’ arguments and concluded they warranted exercising our discretion to

institute on all the challenged claims. That our institution decision came at the outset of the proceeding and informed the parties of the claims and grounds on which trial would center gave the parties adequate notice and opportunity to be heard on the pertinent facts and issues that would be ultimately resolved at trial. *See* Inst. Dec. 14–15 (“Order” specifying grounds for trial).

Our final written decision today does not depart from, nor is it inconsistent with, the initial theory laid out in our institution decision. *See Belden*, 805 F.3d at 1080 (“‘[A]n agency may not change theories in midstream without giving respondents reasonable notice of the change’ and ‘the opportunity to present argument under the new theory.’”) (quoting *Rodale Press, Inc. v. FTC*, 407 F.2d 1252, 1256–57 (D.C. Cir. 1968)).

B. Claim Construction

For an *inter partes* review, we construe claims in an unexpired patent by applying the broadest reasonable interpretation in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard). Under this standard, claim terms generally 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. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A “claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer,” however, and clearly set forth a definition of the claim term in the specification. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002).

While Petitioner does not propose any claim constructions in its Petition (see Pet. 4–5), Patent Owner proposes several claim constructions in its Response (PO Resp. 7–13). Petitioner responds in its Reply.⁵ Pet. Reply 3–9. In light of the parties’ arguments, we address the claim term “production tree,” which appears in the preambles of independent claims 1 and 6.

In the related district court case, the parties agreed on the construction for “tree” as follows: “an assembly of pipes, valves and fittings installed between the wellhead and the flowline.” PO Resp. 9; Ex. 2009, 1. Patent Owner argues that “production tree” should be similarly construed. PO Resp. 9; *see id.* at 7 (“the term ‘Christmas tree,’ the term ‘Production tree,’ and the general term ‘tree’ are interchangeable”). Patent Owner further argues that “the term ‘production tree’ includes all pipes, valves, and fittings between the well head and the boundary formed by the guideposts, otherwise known as the production tree’s frame.” *Id.* at 9; *see also id.* at 8 (“the term ‘Christmas tree’ includes the pipes, valves, and fittings within the guideposts”). According to Patent Owner, this “is consistent with the construction of ‘tree’ that the parties agreed to at the district court.” *Id.* at 9. Patent Owner relies on Mr. Boyadjieff’s expert declaration testimony to

⁵ Patent Owner argues that Petitioner had the opportunity to construe the disputed terms in its Petition and that Petitioner’s “affirmative constructions in [its] Reply are untimely.” PO Sur-reply 3. We disagree. Our rules provide that “[a] reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, or *patent owner response*.” 37 C.F.R. § 42.23(b) (emphasis added). Accordingly, we consider Petitioner’s arguments in response to Patent Owner’s proposed claim constructions.

support its argument. *Id.* at 9 (citing Ex. 2006 ¶¶ 61–64). In addition, Patent Owner directs us to where the specification of the '076 patent teaches, “Preferably, the subsea production assembly comprises a Christmas tree with a frame having guide posts.” *Id.* at 9 (citing Ex. 1001, 2:62–63).

For the most part, Petitioner does not dispute Patent Owner’s proposed construction for “production tree,” namely the parties’ agreed-upon construction for “tree” at the district court. Pet. Reply 4. Petitioner does dispute, however, Patent Owner’s further limitation that “the production tree includes only those components within ‘the boundary formed by the guide posts.’” *Id.* According to Petitioner, “[t]his additional limitation is extraneous and, therefore, inappropriate under [the broadest reasonable interpretation standard].” *Id.* For example, Petitioner points to Patent Owner’s reliance on the specification of the '076 patent, explaining that such “reliance is tenuous at best under longstanding principles of construction, which counsel against reading limitations into the claims from a preferred embodiment.” *Id.* Petitioner also points to Mr. Boyadjieff’s deposition testimony that not all production trees have guide posts. *Id.* at 5 (citing Ex. 1015, 57:24–58:1).

We agree with Petitioner. “Claims must be read in view of the specification, of which they are a part.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995). Here, the specification of the '076 patent describes “a Christmas tree with a frame having guide posts” as being *preferable*, not *necessary*. Ex. 1001, 2:62–63. That guideposts are not a necessary feature for a tree to have is supported by Patent Owner’s expert deposition testimony, as well. When asked during his deposition whether a certain tree has guide posts, Mr. Boyadjieff replied, “No, it doesn’t.” Ex.

1015, 57:24–58:1. Based on the record before us, we find Patent Owner’s interpretation of “production tree” to be overly narrow.

Accordingly, we determine that, under a broadest reasonable construction in light of the specification of the ’076 patent, the term “production tree” means “an assembly of pipes, valves, and fittings installed between the wellhead and the flowline.” This construction is not limited to an assembly of pipes, valves, and fittings within the guideposts, if any, of the tree.

C. Anticipation by Kelly (Claims 1–3)

Petitioner contends that Kelly anticipates claims 1–3. Pet. 5–19. For the reasons explained below, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that Kelly anticipates claims 1–3.

1. Claims 1 and 3

Kelly describes a subsea wellhead production apparatus. Ex. 1004, at [57]. Petitioner explains in its Petition how Kelly discloses each element of claim 1. See Pet. 5–17. Based on the record before us, we are persuaded by Petitioner’s explanations. Patent Owner does not dispute that Kelly discloses most elements recited in claim 1. Patent Owner contends, however, that “Kelly does not disclose at least ‘a tree body including: . . . a wing block,’ ‘a tree body including: . . . a tree guide,’ ‘a utility skid landable on . . . the tree,’ and ‘a processing apparatus.’” PO Resp. 28. We address these limitations in turn.

a. “a tree body including: . . . a wing block”

For this limitation, Petitioner identifies Kelly’s Christmas tree 18, lines 20 and 24, as well as collet body 22 collectively as a “tree body.” Pet. 7. Petitioner further identifies Kelly’s collet body 22 as a “wing block.” *Id.* at 9.

In response, Patent Owner makes two arguments. First, Patent Owner argues that Kelly’s collet body 22 “is coupled to flowlines 20 and 24 outside of Kelly’s tree and, thus, is not part of the claimed production tree or tree body.” PO Resp. 28; *see also id.* at 33 (“Kelly’s tree is 18. Reference numeral 10, on the other hand, refers to more generally the ‘wellhead equipment’ that would include the tree 18 as well as the flow lines 20, 24, and choke assembly 26 that are shown as being outside of tree 18.”). As discussed above, we construe a “production tree” to mean “an assembly of pipes, valves, and fittings installed between the wellhead and the flowline.” Patent Owner explains that “the flowline” in this context is “a pipeline extending outboard of the terminus of a subsea tree,” consistent with the parties’ positions at district court. *Id.* at 31; Ex. 2009, 1. According to Patent Owner, Kelly’s collet body 22 is not attached to Kelly’s tree “because [it] extend[s] outside the tree’s guideposts.” PO Resp. 33. To illustrate this point, Patent Owner directs us to an annotated version of Figure 1 of Kelly, which is reproduced below.

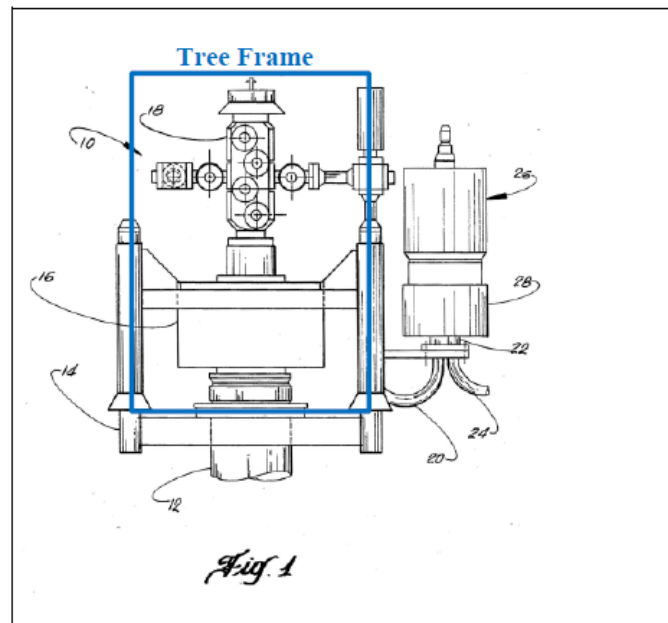
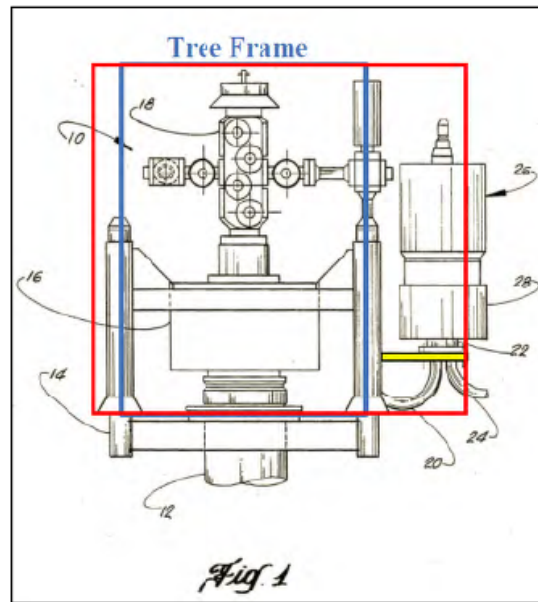


Figure 1 shows a subsea wellhead. Ex. 1004, 2:6. Patent Owner indicates in blue what it considers to be the boundary of Kelly’s tree. PO Resp. 33. Patent Owner further explains that Kelly’s collet body 22 actually “is a production **flowline** body and coupled to **only** flowlines [20, 24]” that “extend outside of the terminus of the tree.” *Id.* at 31, 41; *see also id.* at 33 (“Further, Kelly explicitly claims that the retrievable production flowline body is connected to the production flowlines and not the tree[.]”); *id.* at 36 (“As explained by Mr. Boyadjieff, POSA would have also understood that production flowline body 22 is on the flowline because lines 20 and 24 are flowlines that extend outside the tree, which POSA would have understood to be bound by the tree’s frame.”). Thus, Patent Owner argues that the terminus of Kelly’s tree is a portion of what Patent Owner considers to be the tree frame that connects to line 20. *See* PO Resp. 38 (“the connection to the flowline is at the edge of the tree’s frame”).

Petitioner counters, directing us to its annotated version of Figure 1 of Kelly, which is reproduced below. Pet. Reply 14.



As mentioned above, Figure 1 illustrates a subsea wellhead. Ex. 1004, 2:6. Petitioner indicates in red what it considers to be the boundary of Kelly's tree and explains that the tree properly includes Christmas tree 18, all of line 20, collet body 22, and choke assembly 26, as well as a portion of line 24. Pet. Reply 14–15; *see also* Pet. 6. As for “the flowline,” Petitioner points to Kelly's teaching that “line 24 connects from collet body 22 **to the subsea flowline.**” Pet. Reply 12. Thus, Petitioner implicitly argues that the terminus of Kelly's tree is the portion of line 24 that connects to the subsea flowline.

We agree with Petitioner that Kelly's tree includes Christmas tree 18, collet body 22, lines 20, 24, and choke assembly 26. As discussed above, our construction of “production tree” is not limited to an assembly of pipes, valves, and fittings within the guideposts of the tree. Further, that Kelly's tree includes Christmas tree 18, collet body 22, lines 20, 24, and choke assembly 26 is consistent with the teachings of the '076 patent. For example, Figure 1 of the '076 patent shows a subsea tree assembly including

Christmas tree 13, production flow line 25 and choke body 23. Ex. 1001, 6:34, Fig. 1. In addition, we note that, while each of Kelly's lines 20 and 24 may be a flowline, neither line appears to be *the* flowline extending from the terminus of the tree. See Pet. Reply 9–10 (“the flowline marking the terminus of the ‘production tree’ is not merely a line carrying flow, as it is under BRI, but particularly the external pipeline, or export line, connected to the installed tree that transports flow to the surface or another subsea structure.”); see also PO Resp. 34 (“Petitioner’s expert agrees that lines 20 and 24 are flowlines.”).

It follows that we also agree with Petitioner that Kelly's Christmas tree 18, lines 20, 24, and collet body 22 collectively teach a “tree body.” See Pet. 7. We note Patent Owner's argument that a “tree body” is just the “vertical tubular member of the tree connected to the well head.” PO Resp. 12; see also *id.* at 32 (“Petitioner’s expert was clear during his deposition that Kelly’s ‘tree body is that piece in the middle with the four valves’”); Ex. 1004, Fig. 1 (element 18). We disagree that the recited tree body is limited to this structure. As Petitioner points out, such reading of “tree body” is at odds with the teachings of the '076 patent. Pet. Reply 6–7 (“For example, claim 1 recites a ‘tree body’ including a ‘production bore’ **and** a ‘tree guide.’ The ‘vertical tubular member’ . . . of the '076 Patent's Figure 1 . . . , however, does not include any structure corresponding to a ‘tree guide.’”); see also Ex. 1001, Fig. 1. Accordingly, based on the record before us, we are persuaded that Kelly's tree or tree body includes collet body 22.

Second, Patent Owner argues that Kelly's collet body 22 “is not the wing block of Kelly's tree.” PO Resp. 28. To support this argument, Patent Owner points to Petitioner's expert deposition testimony in which Mr.

Herrmann explains that the term “wing block” has the “connotation that it was bolted directly to the outlet of the tree.” *Id.* at 28–29 (citing Ex. 2004, 151:21–152:12); Ex. 2004, 152:7–11. Patent Owner also points to an annotated version of Figure 1 of Kelly, which is reproduced below.

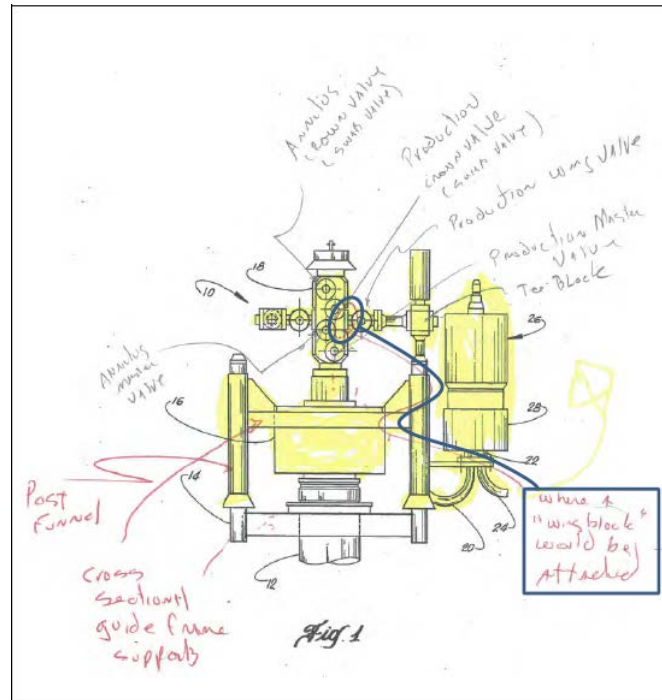


Figure 1 shows a deep subsea wellhead. Ex. 1004, 2:6. The blue annotations highlight where Mr. Herrmann indicated a wing block would be located in Kelly’s system. PO Resp. 30. Given this evidence, Patent Owner concludes that “[Mr. Herrmann] admitted that Kelly does not have a wing block.” *Id.* Even if Kelly’s tree does have a wing block, Patent Owner further argues, “both experts agree that it would be bolted directly to the main part of Kelly’s tree (Kelly’s tree body), and that it would not be collet body 22.” *Id.* (citing Ex. 2006 ¶ 79); Ex. 2006 ¶ 79 (Patent Owner’s expert testifying, “A ‘wing block’ is [a] block of material that is bolted directly to a christmas tree’s body. . . . I also noticed that [Petitioner’s] expert agreed

with my understanding of where a wing block would be located on Kelly's tree"). Patent Owner adds that "none of the components bolted directly to the outlet of Kelly's tree body have 'an upwardly facing vertical bore' as required by claim 1." *Id.*

We disagree with Patent Owner's arguments. As Petitioner points out, Mr. Herrmann "repeatedly states the term 'wing block' is 'not a well-defined term' in the art." Pet. Reply 16; Ex. 2004, 152:5–6 ("wing block is kind of -- it is not a well-defined term"), 152:19–20 ("And like I say this, this is not a well-defined term"), 152:25–153:4 ("wing block which is . . . not a well-defined term"). Under the broadest reasonable interpretation standard, Petitioner explains, collet body 22 "corresponds to the claimed 'wing block'" because it "is a solid, unitary structure—*i.e.*, a block—located on the wing of the tree 18." Pet. Reply 15 (citing Pet. 8). Patent Owner does not persuasively rebut Petitioner's explanation. Based on the record before us, we are persuaded that Kelly's collet body 22 discloses a "wing block."

b. "a tree body including: . . . a tree guide"

For this limitation, Petitioner identifies Kelly's orienting means 52 as a "tree guide." Pet. 9. Petitioner explains that "the orienting means 52 is associated with the tree 18," "facilitat[ing] guided alignment between the choke assembly 26 and the collet body 22, which is part of the tree body." *Id.* at 10–11.

In response, Patent Owner argues that Kelly's orienting means 52 "is outside the tree body" because it "is a part of the complete choke assembly 22/26/28 that is installed outside the tree body." PO Resp. 42. Referring to

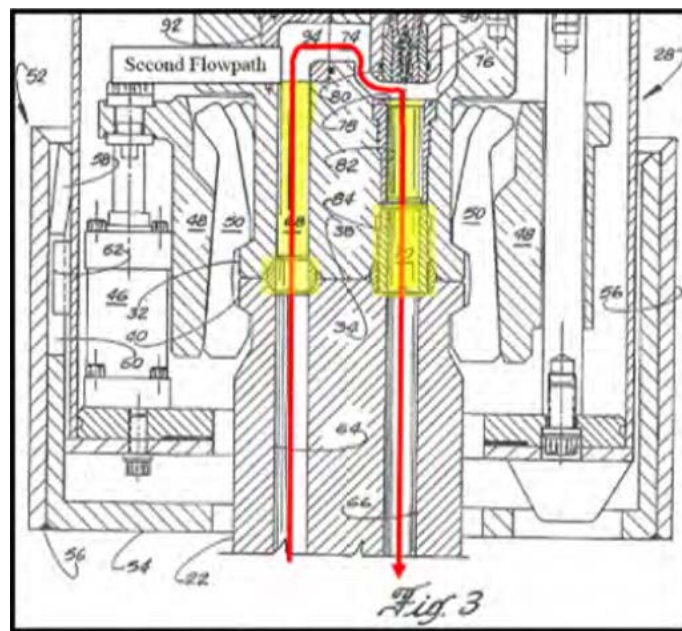
its arguments discussed above with respect to the recited wing block, Patent Owner reiterates that “the production flowline body (collet body 22) is on the flowlines which are outside of Kelly’s production tree and not a part of the tree body.” *Id.* at 44. For the reasons given above, we disagree with Patent Owner. In particular, we are persuaded that Kelly’s tree body includes collet body 22. Based on the record before us, we also are persuaded that Kelly’s tree body includes orienting means 52, which, as Patent Owner points out, “is a part of the complete choke assembly 22/26/28.” *See id.* at 42.

c. “a utility skid landable on . . . the tree”

For this limitation, Petitioner identifies Kelly’s subsea choke assembly 26 as a “utility skid.” Pet. 11. Petitioner further explains that “the subsea choke assembly 26 contains a processing apparatus supported on a frame – *i.e.*, a skid – that may be ‘lowered, landed and installed’ on the tree.” *Id.*

Patent Owner counters, arguing that Kelly’s subsea choke assembly 26 “is landed on Kelly’s flowline and thus outside Kelly’s tree.” PO Resp. 45. Patent Owner explains that choke assembly 26 is landed on collet body 22. *Id.* at 45–46. Referring again to its arguments discussed above with respect to the recited wing block, Patent Owner further explains that “the production flow body (collet body 22) is on the flowlines attached to Kelly’s tree and not a part of the production tree itself.” *Id.* at 46. Again, for the reasons given above, we are persuaded that Kelly’s tree includes collet body 22. Accordingly, based on the record before us, we also are persuaded that Kelly’s subsea choke assembly 26 is landable on Kelly’s tree.

Patent Owner further points out that “the ’076 patent describes and claims ‘a utility skid landable on and supportable by the tree,’ which interfaces with the claimed wing block to provide a flowpath to a processing apparatus,” and argues that “[n]owhere is this taught by Kelly.” *Id.* at 47. Without further explanation, Patent Owner concludes that Petitioner fails to identify a “utility skid” in Kelly. *Id.* We disagree. Claim 1 recites that the utility skid “allows fluid communication in a second flowpath between the production bore, the processing apparatus, and the wing block.” For this aspect of claim 1, Petitioner directs us to an annotated version of Figure 3 of Kelly, which is reproduced below. Pet. 15.



Kelly, Fig. 3 (annotated)

Figure 3 is a sectional view of Kelly’s subsea choke. Ex. 1004, 2:11–12. As Petitioner explains, choke assembly 26 includes choke body 30 with inlet 68, which leads to passage 74 via elbow 94, which, in turn, leads to valve chamber 76, and then to outlet 70. Pet. 15 (citing Ex. 1004, 2:66–3:1). Petitioner also explains that inlet 68 and outlet 70 “are positioned adjacent

the collet body passages 64 and 66 and aligned in a manner that permits fluid flow between these components.” Pet. 15; Ex. 1004, 2:61–65 (cited at Pet. 16). We note further that passage 64 is connected to line 20, which leads to the production bore. See Pet. 8 (annotated Figure 1 of Kelly identifying a “production bore”); Ex. 1004, 2:58–59, Fig. 1. Thus, as Petitioner points out, the arrangement of components shown in Figure 3 of Kelly provides a flow path between Kelly’s production bore, choke body 30 (which Petitioner identifies as part of a “processing apparatus”), and collet body 22 (which Petitioner identifies as a “wing block”). Pet. 15–16; *see also id.* at 8 (identifying a “production bore”), 9 (identifying a “wing block”), 13 (identifying a “processing apparatus”). Based on the record before us, we are persuaded that Kelly’s subsea choke assembly 26 discloses the recited utility skid.

d. “processing apparatus”

For this limitation, Petitioner identifies Kelly’s choke as a “processing apparatus.” Pet. 13. Kelly’s choke includes choke body 30 with valve chamber 76 and valve seat 78 for receiving valve member 80, and it is a part of choke assembly 26. *Id.*; *see* Ex. 1004, Figs. 1, 3.

Patent Owner argues that the ’076 patent, however, “excludes a choke from constituting a processing apparatus.” PO Resp. 48. According to Patent Owner, “the ’076 patent specification discusses both chokes and processing apparatuses extensively and separately,” and “it never states that a choke is a type of processing apparatus.” *Id.* (citing Ex. 1001, 15:35–39 (“fluids pass through the choke before being diverted to the remote processing apparatus”)). Patent Owner further explains that “a choke is

simply a device that the operator can adjust to regulate how fast the oil/gas will flow from the well.” *Id.* In addition, Patent Owner notes that the ’076 patent provides examples of processing apparatuses with functions that a choke does not perform. *Id.* at 48–49. Patent Owner relies on the declaration testimony of Mr. Boyadjieff to support its argument. *Id.* (citing Ex. 2006 ¶¶ 102–103).

In response, Petitioner points out that “a descendant application sharing a common specification defines a ‘processing apparatus’ in the claims as including a ‘pressure regulation apparatus.’” Pet. Reply 17–18; *see also* Ex. 1008 (claim 67). Petitioner also points out that both parties’ experts agree that “adjustments to the choke result in pressure changes.” *Id.* at 18; *see also* Ex. 1003 ¶ 14 (Mr. Herrmann testifying that “the valve member 80 of the subsea choke assembly 26 is adjustable to control the flow area available to the fluid flow, and therefore affect the pressure and flow rate of production fluids” and “a choke can be considered a pressure regulation apparatus”); Ex. 1016, 138:25–139:2 (Mr. Boyadjieff testifying that “it’s adjusting the choke, which in turn will change your pressure of the well control, the pressure of the well”).

Based on the record before us, we agree with Petitioner. Although the ’076 patent may refer to a choke and a processing apparatus separately, Patent Owner does not direct us to any language in the patent or any other evidence precluding a choke from being a processing apparatus. Indeed, given Patent Owner’s characterization of a choke as a means for regulating flow, the claims in the descendant application imply that a choke may be a type of processing apparatus. *See* Ex. 1008 (claim 67). In addition, as Petitioner notes, the examples of processing apparatuses that the ’076

provides are just examples; they are “non-limiting.” *See* Pet. Reply 18. Accordingly, we are persuaded that Kelly’s choke discloses a “processing apparatus.”

In view of the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that Kelly anticipates claim 1. Having reviewed the parties’ arguments (*see* Pet. 19; PO Resp. 51) as to whether Kelly anticipates dependent claim 3, we also conclude that Petitioner has demonstrated by a preponderance of the evidence that Kelly anticipates this dependent claim.

2. *Claim 2*

Claim 2 adds the limitation “a choke body attached to the tree wing block and forming the upwardly facing vertical bore.” For this limitation, Petitioner argues that “[t]he portion of [Kelly’s] collet body 22 that the connector of choke assembly 26 grasps further provides a ‘choke body’ because it is a structural ‘body’ associated with the choke assembly 26.” Pet. 18; *see* Ex. 1004, Figs. 1, 3. Petitioner also identifies each of Kelly’s passages 64, 66 as an “upwardly facing vertical bore.” Pet. 18; *see* Ex. 1004, Fig. 3.

In response, Patent Owner argues that “claim 2 requires more than mere association, it requires a choke body to form the upwardly facing vertical bore of the claimed wing block.” PO Resp. 50. Relying on Mr. Boyadjieff’s declaration testimony, Patent Owner explains that “the choke body is the main central part of the choke because the plain and ordinary meaning of ‘body’ is the ‘main, central or principal part.’” *Id.* (citing Ex. 2006 ¶ 105). Patent Owner also explains that collet body 22 “is not a part of

Kelly's choke or choke body, but is the structure that the choke lands upon,” and that “the alleged upward facing vertical bores are formed within the flowline body 22 and not the choke that is landed thereon.” *Id.*

We disagree. Patent Owner does not explain sufficiently what it considers to be a “choke body” in Kelly and why collet body 22 cannot be a part of that structure. Figure 3 of Kelly, which is reproduced below, shows a “detailed sectional view of the improved subsea choke.” Ex. 1004, 2:11–12.

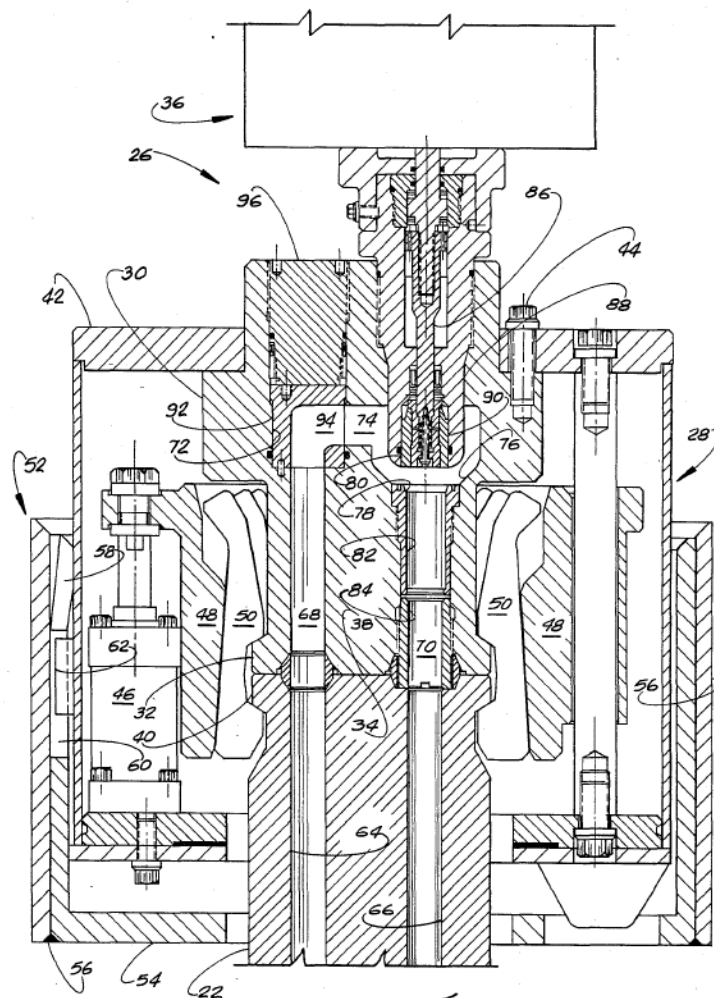


Fig. 3

In particular, Figure 3 shows choke assembly 26, collet body 22, and collet connector 28. Choke assembly 26 includes choke body 30, which mates

with collet body 22 at surfaces 34 and 38. *Id.* at 2:34–39. Kelly teaches that these mating surfaces may have any orientation “*as long as they are mating* and provide communication from passage 64 to inlet 68 and from outlet 70 to passage 66.” *Id.* at 3:29–35 (emphasis added). Based on the teachings in Kelly, we are persuaded that Kelly’s collet body 22 discloses a “choke body.”

In view of the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that Kelly anticipates claim 2.

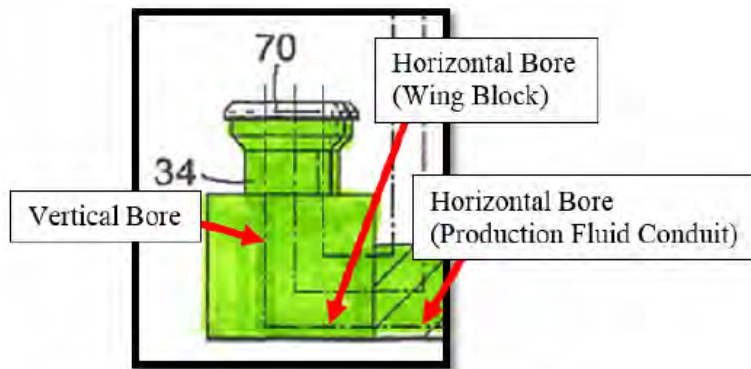
D. Obviousness over Kelly and Andersen (Claims 1–3)

Petitioner contends that claims 1–3 would have been obvious over Kelly and Andersen. Pet. 19–27. For the reasons explained below, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claims 1–3 would have been obvious over Kelly and Andersen.

As discussed above, Petitioner argues that Kelly discloses each limitation recited in claims 1–3. Petitioner alternatively relies additionally on Andersen for teaching certain of the limitations recited in the claims. For the most part, Patent Owner does not dispute Petitioner’s analysis of claims 1–3 in relation to Kelly and Andersen. We therefore focus our discussion on the disputed elements of the claims, primarily “a lateral production port extending from the bore into a wing block.”

1. “a lateral production port extending from the bore into a wing block”

Petitioner relies additionally on Andersen for teaching “a lateral production port extending from the [production] bore into a wing block,” identifying Andersen’s hub connector 34 as a “wing block.” Pet. 21–22. Referring to its annotated version of Figure 2b of Andersen, which is reproduced below, Petitioner explains that hub connector 34 “includes a horizontal bore communicating with a horizontal bore of a production fluid conduit 30 through a *laterally oriented* production port, with the horizontal bore of the block leading to an upwardly facing vertical bore through a bend within the block.” *Id.*



Andersen, Fig. 2b (annotated)

Petitioner’s annotated figure shows a portion of a wellhead shown in Figure 2b of Andersen. *See Ex. 1005, 8:25–28.* According to Petitioner, one of ordinary skill in the art would have combined the teachings of Kelly and Andersen either by “entirely substituting Andersen’s hub connector 34 in lieu of Kelly’s collet body 22 and at least a portion of line 20” or by “incorporating the bend in the line 20 within the robust unitary structure of the collet body 22.” *Id.* at 23.

In response, Patent Owner argues that “both of [Petitioner’s] modifications to Kelly occur at Kelly’s production flowline (collet) body 22,” which Patent Owner continues to urge “is not a wing block and is located outside Kelly’s production tree on the flow line and not on the tree body.” PO Resp. 53. According to Patent Owner, Petitioner “makes no obviousness argument to address this deficiency.” *Id.* at 54. Patent Owner further argues that Petitioner’s “proposed combination will never provide a wing block because this structure is not bolted directly to Kelly’s tree body.” *Id.* In support of its arguments here, Patent Owner refers us to its arguments discussed above with respect to anticipation by Kelly. *Id.*

For the reasons given above, we disagree with Patent Owner. Accordingly, based on the record before us, we are persuaded that Kelly and Andersen teach “a lateral production port extending from the bore into a wing block,” as recited in claim 1.

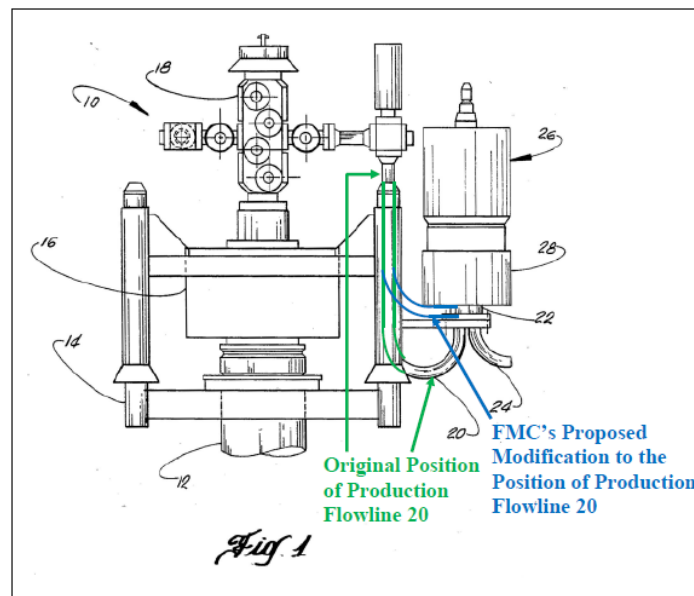
In addition to showing that Kelly and Andersen teach each of the claim limitations, however, Petitioner must provide “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). In that regard, Petitioner argues:

Here, both Kelly and Andersen disclose a structure formed as [a] solid unitary block (*i.e.*, Kelly’s collet body 22 and Andersen’s hub connector 34) that serves as a connecting point on a wing branch for routing fluid to a processing module (*i.e.*, Kelly’s choke assembly 26 and Andersen’s flow control package 82). However, Andersen’s wing branch represents a clear improvement over Kelly’s because it incorporates the bend in Kelly’s line 20 within the wing block, and therefore provides a

more structurally sound, compact assembly. From a structural perspective, the minimum bend radius in Kelly's line 20 is inherently limited by the radius at which the pipe can be bent without failure. The radius of curvature in Andersen's hub connector 34, however, is not similarly limited. Thus, Andersen's configuration can be more compact. Andersen's configuration can also be also stronger and stiffer, because the unitary block of Andersen's hub connector 34, as compared to Kelly's pipe bend of line 20, has more material.

Pet. 22–23 (internal citations omitted); *see also* Ex. 1004, Fig. 1; Ex. 1005, Figs. 1, 2b, 4. Petitioner relies on the declaration testimony of Mr. Herrmann to support its argument. *Id.* (citing Ex. 1003 ¶¶ 29–30).

Patent Owner counters, arguing that Petitioner's "proposed modifications to Kelly do not change the beginning point of line 20 and do not change the location of the production flowline body 22," which means that "line 20 of Kelly is still required to bend to reach the modified production flowline body 22 or Andersen's hub connector 34." PO Resp. 52. To illustrate this point, Patent Owner directs us to an annotated version of Figure 1 of Kelly, which is reproduced below. *Id.*



As mentioned above, Figure 1 of Kelly illustrates a deep subsea wellhead. Ex. 1004, 2:6. According to Patent Owner, the annotations show that neither of Petitioner's proposed modifications provides any improvement over Kelly alone. PO Resp. 52.

We disagree with Patent Owner. As Petitioner points out in its Reply, "[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference." Reply 20 (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). "Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art." *Keller*, 642 F.2d at 425. Moreover, "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton," and would, in light of modifying Kelly's system to include the features of Andersen's hub connector 34, make any necessary additional modifications to Kelly's system in order to realize as much as possible the advantages of adding Andersen's features in the first place. See *KSR*, 550 U.S. at 421; Reply 19 ("In modifying the gradual pipe bend in Kelly to, instead, constitute a unitary block structure, such as described in Andersen, the Petition and Mr. Herrmann's testimony do not suggest the direction of the flowpath would be unchanged."). Accordingly, based on the record before us, we are persuaded by Petitioner's proffered reasoning for modifying Kelly's system either by replacing Kelly's collet body 22 with Andersen's hub connector 34 or by incorporating the bend in line 20 within collet body 22.

2. *Other Disputed Limitations*

As discussed above, claim 1 further recites “a tree body including: . . . a tree guide” and “a utility skid landable on . . . the tree.” With respect to these limitations, as well as the limitations recited in claims 2 and 3, Patent Owner notes that Petitioner relies solely on Kelly and “makes no obviousness argument for the missing features.” PO Resp. 54–55. Thus, referring us to its arguments discussed above with respect to anticipation by Kelly, Patent Owner argues that claims 1–3 are patentable over Kelly and Andersen based on the “missing features.” *Id.* For the reasons give above, we are persuaded that Kelly teaches the additional disputed limitations recited in claims 1–3.

In view of the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–3 would have been obvious over Kelly and Andersen.

E. Obviousness over Andersen, Hopper, and Kelly (Claims 1, 3, and 6–9)

Petitioner contends that claims 1, 3, and 6–9 would have been obvious over Andersen, Hopper, and Kelly. For the reasons explained below, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that these claims would have been obvious over the references.

Patent Owner does not dispute that Andersen, Hopper, and Kelly teach most of the elements recited in the claims. Patent Owner argues, however, that these references do not teach the following claim limitations: “production tree,” “second flowpath,” “wing block being mounted to the tree body,” “wing block has a production wing valve,” and “production fluid conduit.” PO Resp. 55–71. We address these limitations in turn.

1. “*production tree*”

The preamble of claim 1 recites a “production tree.” For this limitation, Petitioner relies on both Andersen and Hopper. Petitioner identifies Andersen’s flow spool 72 as a “production tree.” Pet. 29. To the extent that Andersen’s flow spool is not considered to be a “production tree,” however, Petitioner alternatively identifies Hopper’s spool tree 34 as a “production tree.” *Id.* Petitioner argues that “it would have been obvious to exchange Andersen’s flow spool 72 for a production tree, such as described by Hopper, which functions like Andersen’s flow spool 72, plumbing the production tree to Andersen’s hub 34 and flow control package 82.” *Id.*

As mentioned above, Petitioner must provide “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *See Kahn*, 441 F.3d at 988. In that regard, Petitioner argues that one of ordinary skill in the art would have modified Andersen to include Hopper’s spool tree 34 “at least because such an arrangement amounts to no more than a simple substitution of one known element for another to obtain predictable results.” *Id.* at 30. In support of this argument, Petitioner details the similarities between Andersen’s flow spool 72 and Hopper’s spool tree 34, relying on the declaration testimony of Mr. Herrmann. *Id.* at 30–31 (citing Ex. 1003 ¶¶ 15–16, 41).

Petitioner also argues that one of ordinary skill in the art would have combined Andersen and Hopper “at least because such an arrangement would be the predictable result of using a known technique to improve a similar apparatus in the same way.” *Id.* at 32. Petitioner explains that Hopper teaches that “the spool tree takes the place of a conventional Christmas tree but differs therefrom in having a comparatively large vertical

through bore without any internal valves,” which can accommodate completion components and allows for those components to be pulled through a BOP stack without disturbing the spool tree in workover situations. *Id.* at 32–33 (citing Ex. 1006, 2:3–15). Petitioner also notes other advantages of using Hopper’s spool tree, including Hopper’s complementary guide means on the tubing hanger and spool tree, which allows the spool tree to be landed at any angular orientation onto the wellhead housing. *Id.* at 33 (citing Ex. 1006, 2:18–26). Another advantage, according to Petitioner, includes providing a close fit between the spool tree’s downwardly depending location mandrel and a bore of the wellhead housing, which allows for secure mounting that transmits bending stresses to the housing from heavy equipment without the need for excessively sturdy connections. *Id.* (citing Ex. 1006, 3:24–35).

In response, Patent Owner makes three arguments. First, Patent Owner argues that Petitioner’s proposed combination “changes Andersen’s principle of operation because Andersen’s system is specifically designed to operate **without** a tree.” PO Resp. 55–56. Patent Owner explains that “Andersen teaches away from operating its system with a Christmas tree.” *Id.* at 56 (citing Ex. 1005, 19:15–16 (“the need for the known kinds of christmas trees is eliminated”)). Patent Owner further explains that a skilled artisan “would have been discouraged from modifying Andersen’s system, which is meant to be used in lieu of conventional Christmas trees, in a way that would strip the benefits of the disclosed flow control package – the precise result if Andersen’s wellhead connection is reverted back to a standard Christmas tree as [Petitioner] proposes.” *Id.* at 56–57. Patent

Owner relies on the declaration testimony of Mr. Boyadjieff to support its argument. *Id.* (citing Ex. 2006 ¶ 114).

We disagree with Patent Owner. That Andersen’s system can operate without a conventional Christmas tree does not mean that using such a tree with the system will change its principle of operation or is even discouraged. Indeed, as Petitioner points out in its Reply, Andersen teaches explicitly that “[a]t times it may be desirable to use a conventional christmas tree.” Reply 20; Ex. 1005, 21:17–18. Petitioner also points out that “Andersen expressly shows its module on a conventional Christmas tree” in Figure 24. Reply 20 (citing Ex. 1005, Fig. 24). Andersen describes Figure 24 as illustrating “an embodiment that combines the present invention with a ‘conventional’ completion.” Ex. 1005, 21:16–17.

Second, Patent Owner argues that Petitioner fails to provide any reason for combining Andersen and Hopper. PO Resp. 57. According to Patent Owner, the advantages of using Hopper’s spool tree “are only advantages . . . when compared to other types of Christmas trees, which Andersen is not.” *Id.* Patent Owner notes again that “a basic principle of Andersen’s invention is to replace conventional Christmas trees” and explains that a skilled artisan “would not modify Andersen with known kinds of Christmas trees, as discussed above, and this is the only combination rationale provided by [Petitioner].” *Id.* at 58. Relying on the declaration testimony of Mr. Boyadjieff, Patent Owner also adds that “Andersen already contains all of Hopper’s benefits (and more) by utilizing the disclosed flow control package connected directly to the wellhead and without the use of a conventional Christmas tree.” *Id.* at 57 (citing Ex. 2006 ¶ 115).

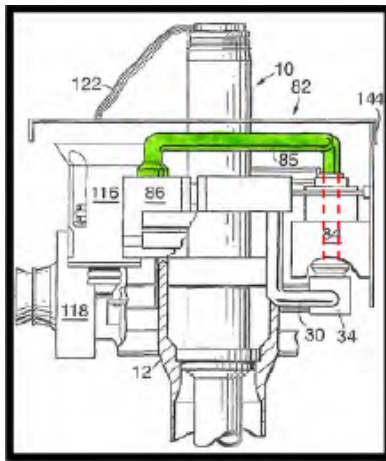
We disagree with Patent Owner. We recognize that Hopper's spool tree provides the advantage of having a large vertical through bore when compared with conventional Christmas trees, as Patent Owner points out. PO Resp. 57. As for the advantages of having Hopper's guide means and close fitting mandrel, however, neither Patent Owner nor Mr. Boyadjieff explains sufficiently how Andersen's spool 72 "already contains all of Hopper's benefits." *See id.*; Reply 20 ("Patent Owner presents the declaration of Mr. Boyadjieff as allegedly establishing Andersen achieves every benefit of Hopper. The declaration, however, provides little to no corroborating evidence or discussion on the topic.") (internal citations omitted). Based on the record before us, we are persuaded by Petitioner's proffered reasoning for modifying Andersen to include Hopper's spool tree, which has a rational underpinning to support the legal conclusion of obviousness. *See Kahn*, 441 F.3d at 988.

Lastly, Patent Owner argues that a person of ordinary skill in the art "would not combine Andersen and Hopper as [Petitioner] suggests because adding the vast weight of Andersen's flow control package to the end of Hopper's branch would destroy the branch and render the combination inoperable." PO Resp. 58. Patent Owner explains that "[Petitioner's] proposed combination requires adding Andersen's flow control package-to-tree connections (34/84) to the end of Hopper's production wing branch," and that "[b]ecause Andersen's flow control package is designed to replace conventional Christmas trees and further include other equipment, POSA would understand that the package would be very heavy, likely, weighing many tons." *Id.* at 58–59.

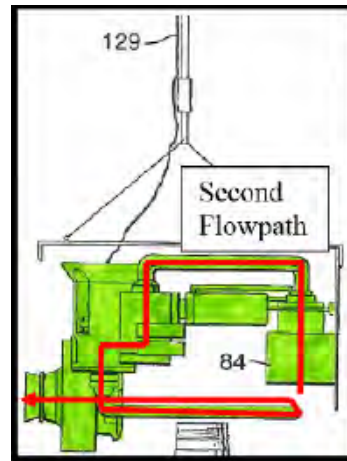
We disagree with Patent Owner. As discussed above, “[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.” *Keller*, 642 F.2d at 425. Moreover, “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton,” and would, in light of modifying Andersen’s system to include Hopper’s spool tree, make any necessary additional modifications to compensate for the weight of Andersen’s flow control package. See *KSR*, 550 U.S. at 421; Reply 21 (“a POSITA readily knows how to compensate for the weight of Andersen’s flow control package”).

2. “second flowpath”

Claim 1 also recites “a second flowpath between the production bore, the processing apparatus, and the wing block.” For this limitation, Petitioner directs us to annotated versions of Figures 4 and 9 of Andersen, which are reproduced below. Pet. 40.



Andersen, Fig. 4 (annotated)



Andersen Fig. 9 (annotated)

Figure 4 of Andersen shows a side view of a flow control package and wellhead, and Figure 9 of Andersen shows one of various stages of a well drilling and completion operation. Ex. 1005, 8:31–9:2. Petitioner identifies Andersen’s flow control package 82 as including a “processing apparatus” and Andersen’s connector hub 34 as a “wing block.” Pet. 35, 39–40.

Petitioner explains that “[p]roduction fluid is conveyed in a flowpath from the pipe 85 to a flow block 86, from the flow block 86 to a production choke 116, and from the production choke to a flow line connector 118.” Pet. 40.

Petitioner argues that “[t]hese elements provide the claimed ‘second flowpath.’” *Id.* at 41.

Patent Owner counters, arguing that “the production fluid[] in Andersen flow[s] from the alleged production bore to the alleged wing block and then to the alleged processing apparatus,” but “does not flow back to the wing block after it flows through the processing apparatus.” PO Resp. 61. According to Patent Owner, “[t]he plain language of the claim requires a specific flowpath that goes from the production bore, to the processing apparatus, and then to the wing block.” *Id.* at 60. Patent Owner further explains that Petitioner’s analysis “suffers from the significant drawback of requiring the flowline connection to be broken if Andersen’s flow-control package is to be retrieved to the surface.” *Id.* at 60.

In response, Petitioner argues that “[t]he claims mandate fluid combination ‘*between*’ the recited structural components, not ‘*from*’ one

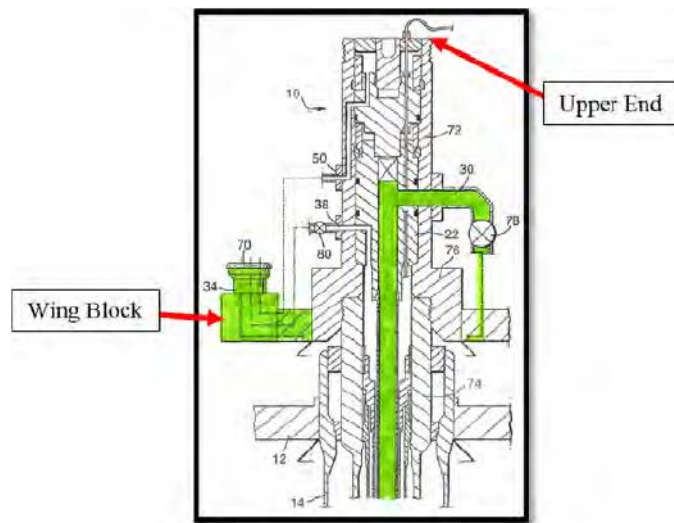
component to another in a prescribed order.”⁶ Reply 22. Petitioner further points out that “the claims cover ‘embodiments . . . for both recovery of production fluids and injection of fluids,’ where “[r]ecovery and injection scenarios dictate fluid flow in ‘reversed’ directions.” *Id.* (citing Ex. 1001, 5:17–18, 15:40–45).

We agree with Petitioner. The claims do not recite the direction in which the fluid flows. Nor do they exclude a production tree whose flowline connection becomes broken when its utility skid is retrieved to the surface. Indeed, the claims do not address at all the scenario in which the utility skid is retrieved to the surface. Accordingly, based on the record before us, we are persuaded that Andersen teaches the recited “second flowpath.”

3. *“wing block being mounted to the tree body”*

Like claim 1, independent claim 6 recites a “wing block.” Claim 6 further recites that the wing block is “mounted to the tree body.” For this limitation, Petitioner identifies Andersen’s hub connector 34 as a “wing block.” Pet. 35. Referring to an annotated version of Figure 2b of Andersen, which is reproduced below, Petitioner explains that hub connector 34 “is mounted to the flow spool 72 (*i.e.*, the tree body) below its upper end.” *Id.* at 43.

⁶ Claim 1 recites “fluid communication.” Petitioner argues that the claim “mandate[s] fluid *combination*.” Reply 22 (emphasis added). We presume this to be a typographical error and treat Petitioner’s argument as being directed instead to fluid *communication*.



Andersen Fig. 2b (annotated)

Figure 2b of Andersen shows a wellhead. Ex. 1005, 8:25–28. Petitioner further points out that “Hopper’s production wing is likewise below the upper end of the tree body, and thus would incorporate Andersen’s hub below its upper end.” Pet. 43–44; *see also* Ex. 1006, Fig. 2. We note that Petitioner’s proposed combination of Andersen and Hopper “retain[s] Andersen’s connector hub 34, connecting it to Hopper’s production wing branch (e.g., downstream of valve 70) to interface with Andersen’s flow control package 82.” Pet. 35; *see also* Ex. 1006, Fig. 2.

In response, Patent Owner argues that Petitioner’s proposed combination “attaches the alleged wing block to the alleged wing branch of Hopper’s spool tree and not the tree body of Hopper’s spool tree.” PO Resp. 63. Patent Owner explains that “a ‘tree body’ is the ‘vertical tubular member of the tree connecting to the well head.’” *Id.* For the reasons given above with respect to anticipation by Kelly, we disagree that a “tree body” is limited to such structure. Patent Owner does not explain sufficiently why Hopper’s tree body cannot include a wing branch. Based on the record

before us, we are persuaded that Hopper's tree body includes the wing branch.

Patent Owner further argues that "for one part to be 'mounted to' another, it must be directly attached thereto." *Id.* at 63. Patent Owner relies on the declaration testimony of Mr. Boyadjieff to support its argument. See *id.* at 13 (citing Ex. 2006 ¶ 68). As discussed above, Petitioner's proposed combination of Andersen and Hopper "retain[s] Andersen's connector hub 34, connecting it to Hopper's production wing branch (e.g., downstream of valve 70)." Pet. 35. Given this arrangement and referring to an annotated version of Figure 8 of Hopper, which is reproduced below, Patent Owner concludes that Petitioner's proposed combination therefore "does not attach the alleged wing block of Andersen to Hopper's tree body." PO Resp. 64.

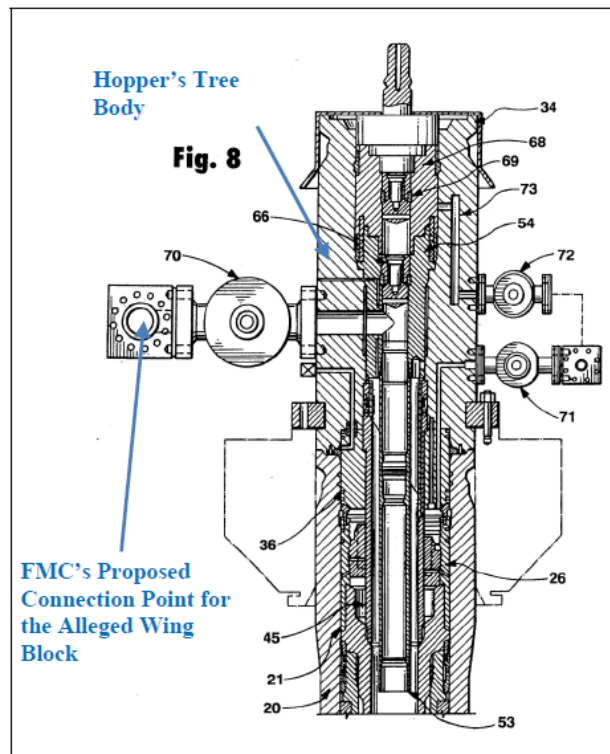


Figure 8 of Hopper shows a spool tree in the completed production mode. Ex. 1006, 7:17–18.

We disagree with Patent Owner. The claims do not require the wing block to be *directly* attached to the tree body. Nor does Patent Owner direct us to any other portion of the '076 patent requiring direct attachment. In addition, Mr. Boyadjieff only testifies conclusorily that a person of ordinary skill in the art would have understood the term “mounted to” as requiring a direct connection or attachment. See Ex. 2006 ¶ 68. Even assuming the claims do require direct attachment, however, we note that Patent Owner’s argument would still be unavailing because we are persuaded that Hopper’s tree body includes the wing branch, as discussed above.

4. “*wing block has a production wing valve*”

Claim 8 recites that the wing block additionally “has a production wing valve.” For this limitation, Petitioner points out that Andersen’s flow spool 72 includes production conduit 30 with one end terminating at a point within hub connector 34 and that flow control package 82 is landable on and supportable by flow spool 72 via hub connectors 34, 84. Pet. 44–45; see also Ex. 1005, 10:11–15. Petitioner further explains that “production conduit 30 – and therefore the wing block incorporated in the hub connector 34 – ‘is thereby connected via pipe 85 to a production flow block 86 containing flow control valves,’” which “‘may have functions equivalent to the production master and/or wing valves in a Christmas tree.’” Pet. 45 (citing Ex. 1005, 13:5–9). According to Petitioner, “when the flow control package 82 is installed on the flow spool 72, the wing block (*i.e.*, the block portion of hub connector 34) is associated with a production wing valve.” *Id.* at 45.

Patent Owner counters, arguing that “claim 8 requires more than mere association.” PO Resp. 69. According to Patent Owner, a person of ordinary skill in the art “would have understood that the wing block has a wing valve when the wing valve is incorporated into the wing block.” *Id.* To illustrate this point, Patent Owner directs us to an annotated version of Figure 1 of the '076 patent, which is reproduced below.

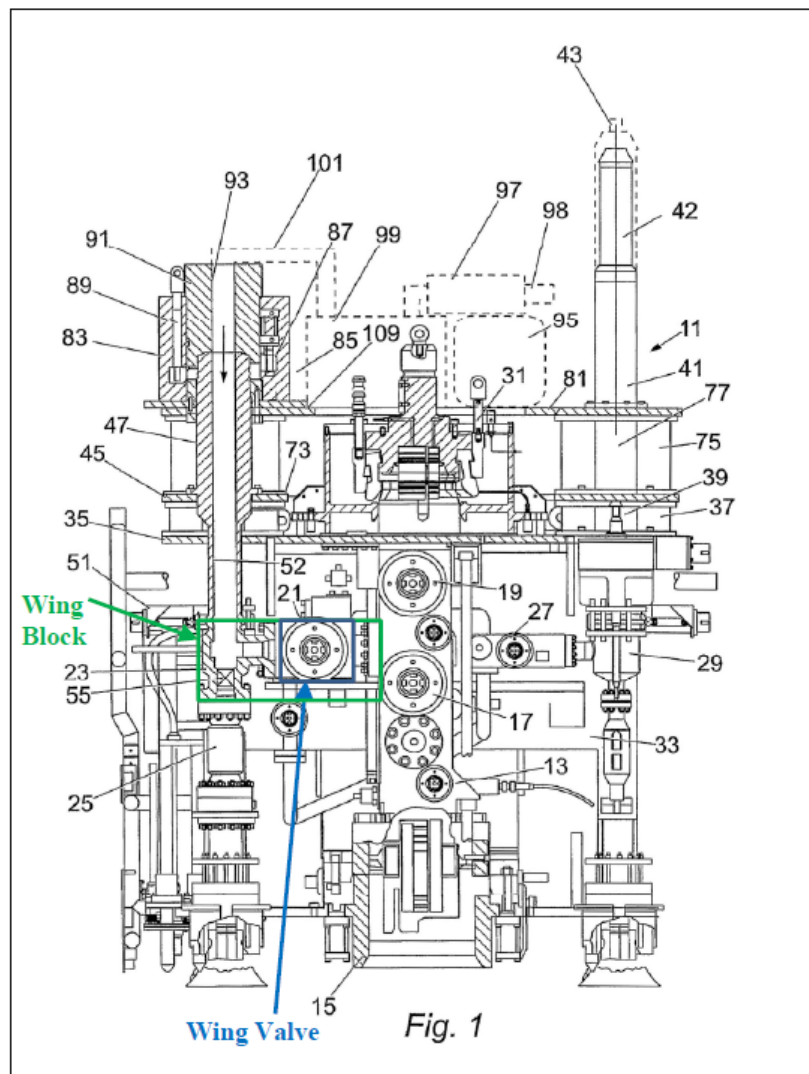


Figure 1 of the '076 patent shows a subsea tree assembly. Ex. 1001, 6:34.

In response, Petitioner points out that Patent Owner’s annotations show the wing block of the '076 patent as including wing valve 21 and a

portion of choke body 23. Reply 24. Referring to an annotated version of Figure 2 of the '076 patent, which is reproduced below, Petitioner further points out that these elements are “simply connected structurally by bolts (red).” *Id.* at 24–25.

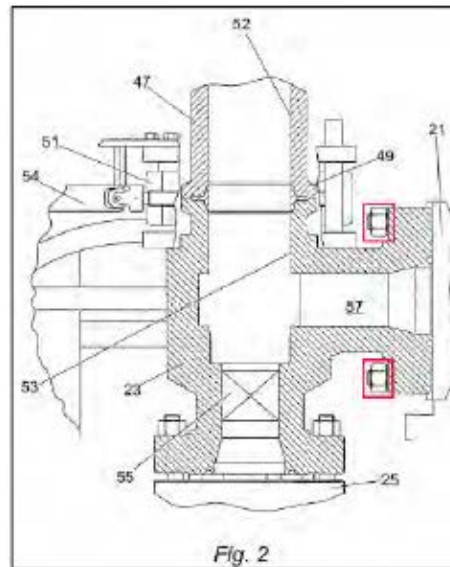


Figure 2 of the '076 patent shows a sectional view of a choke body. Ex. 1001, 6:37–38. Petitioner argues that Andersen’s hub connector 34 is similarly “structurally connected to the wing valve in flow control package 82 via pipe 85.” Reply 25.

Based on the record before us, we agree with Petitioner. The claims do not require the production wing valve to be “incorporated” into the wing block. Nor does Patent Owner direct us to any other portion of the ’076 patent requiring such incorporation. Indeed, as Petitioner points out, the ’076 patent shows that the production wing valve 21 is attached to choke body 23, but not incorporated in choke body 23. See Reply 24–25; Ex. 1001, Fig. 2. Accordingly, we are persuaded that Andersen’s hub connector 34 has a production wing valve.

5. “*production fluid conduit*”

Claim 7 recites that “the production fluid conduit extends vertically downward from the utility skid.” For this limitation, Petitioner identifies Andersen’s flow control package 82 as a “utility skid” and Andersen’s pipe 85 as a “production fluid conduit.” See Pet. 38, 40, 44 (referring to analysis of claim 1). Petitioner further explains that “Andersen teaches that the flow control package 82 includes a pipe 85 having a downwardly extending portion that receives production flow from the production conduit 30.” *Id.* at 40.

Patent Owner counters, arguing that claim 7 requires the conduit to extend *below* the utility skid. PO Resp. 65. To support its argument, Patent Owner relies on Mr. Boyadjieff’s declaration testimony that a person of ordinary skill in the art “would have understood that in order for a first object to extend downward from a second object, the first object must be below the second.” *Id.* (citing Ex. 2006 ¶¶120–121). According to Patent Owner, Andersen’s pipe 85 does not extend below control package 82; rather it “is merely oriented in the vertical direction.” *Id.* at 66. To illustrate this point, Patent Owner directs us to an annotated version of Figure 9 of Andersen, which is reproduced below.

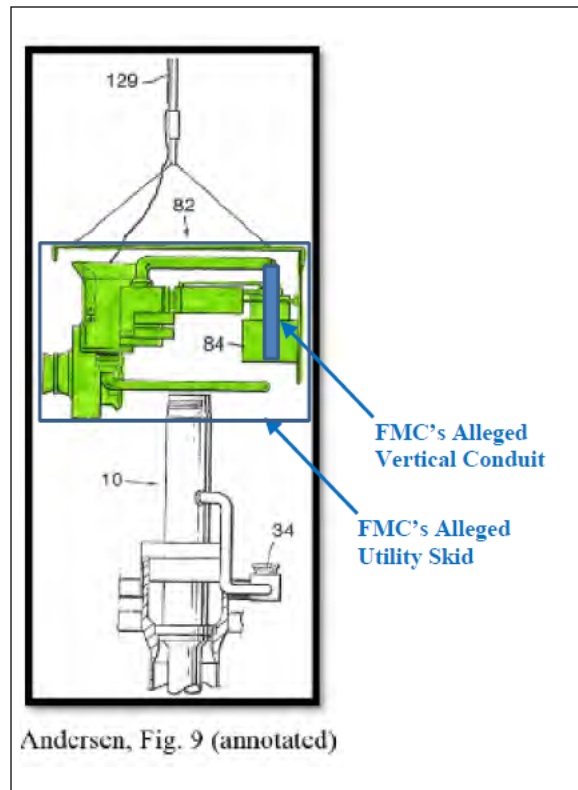


Figure 9 of Andersen shows one of various stages of a well drilling and completion operation. Ex. 1005, 9:1–2.

We disagree with Patent Owner. Claim 7 does not recite that the production fluid conduit extends below the utility skid. Nor does Patent Owner or Mr. Boyadjieff point to any other portion of the '076 patent that requires such arrangement. Instead, claim 7 recites that the conduit extends vertically downward from the skid. To illustrate this feature, Figure 11 of the '076 patent is reproduced below.

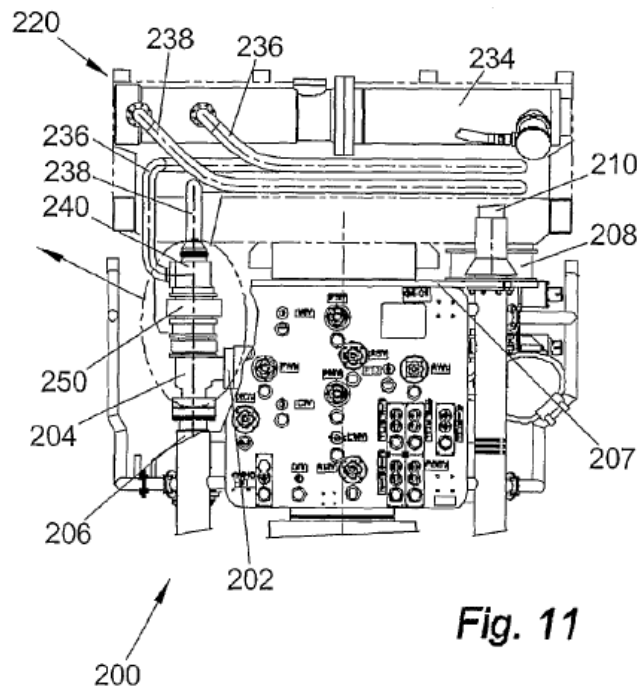


Fig. 11

Figure 11 shows subsea Christmas tree 200 and skid 220 with pump 234 mounted on the skid. Ex. 1001, 11:28–29, 11:43–44. Pump 234 has an outlet and an inlet to which respective conduits 236, 238 are attached. *Id.* at 11:44–46. As Figure 11 shows, conduits 236, 238 extend vertically downward from the skid via pump 234. This is similar to what Figure 9 of Andersen shows. We note that conduits 236, 238 also extend below skid 220, but this feature is not required by claim 7. Accordingly, based on the record before us, we are persuaded that Andersen’s pipe 85 teaches the recited “production fluid conduit.”

In view of the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1 and 6–8 would have been obvious over Andersen, Hopper, and Kelly. Having reviewed the parties’ arguments (*see* Pet. 41, 46; PO Resp. 71) as to whether claims 3 and 9 would have been obvious over Andersen, Hopper, and Kelly, we also determine that Petitioner has demonstrated by a preponderance of

the evidence that these claims would have been obvious over those references.

F. Anticipation by Andersen (Claims 1, 3, and 6–9)

Petitioner contends that Andersen anticipates claims 1, 3, and 6–9. Pet. 46–53. For the reasons explained below, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that Andersen anticipates claims 1–3.

Andersen describes a subsea completion apparatus. Ex. 1005, at [54], [57]. Petitioner explains in its Petition how Andersen discloses each element of claim 1. *See* Pet. 47–52. Based on the record before us, we are persuaded by Petitioner’s explanations. For the most part, Patent Owner does not dispute Petitioner’s analysis of claim 1 in relation to Andersen. We therefore focus our discussion on the disputed elements of the claim: “aligning member that is engageable with the tree guide” and “second flowpath.”

1. “aligning member that is engageable with the tree guide”

Claim 1 recites “an aligning member [of the utility skid] that is engageable with the tree guide [of the tree body] to align the utility skid with respect to the tree.” For this limitation, Petitioner identifies Andersen’s flow spool 72 as a “tree” and Andersen’s flow control package 82 as a “utility skid.” Pet. 38, 47–48. Petitioner also identifies the outer housing of Andersen’s hub connector 84 as an “aligning member” and the enlarged top of Andersen’s hub connector 34 as a “tree guide.” Pet. 51–52. Petitioner further directs us to where Andersen teaches that “hub connector 84 lies

above and mates with the hub connector 34.” *Id.* at 50; Ex. 1001, 12:30–31. Petitioner explains that hub connector 84 “encircles the enlarged outer perimeter of hub connector 34, and aligns [itself] with respect to the hub connector 34 as the flow control package 82 is lowered onto the flow spool 72 (*i.e.*, the tree body) by deflecting off the top of connector hub 34.” Pet. 51. Petitioner also explains that once “engaged by the outer housing of hub connector 84, [the enlarged top of hub connector 34] guides the remainder of the hub connector 84 onto the hub connector 34.” *Id.* Petitioner relies on the declaration testimony of Mr. Herrmann to support its explanations. *Id.* (citing Ex. 1003 ¶ 37).

To the extent that Andersen does not teach the recited tree guide and aligning member, Petitioner argues alternatively that “such generic components for facilitating guided alignment during the subsea installation of mating production tree components are undoubtedly necessary.” *Id.*

In response, Patent Owner directs us to an annotated version of Figure 4 of Andersen, which is reproduced below, and argues that nothing on Andersen’s tree body guides the connection between hub connectors 34, 84. PO Resp. 73.

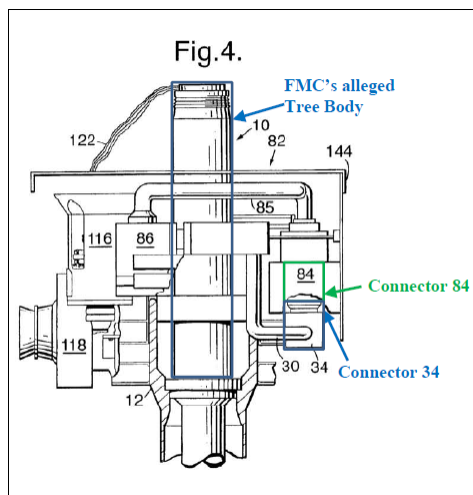


Figure 4 of Andersen shows a flow control package and wellhead. Ex. 1005, 8:31. Relying on Mr. Boyadjieff's declaration testimony, Patent Owner further argues that no part of Andersen's hub connector 34 "is designed to assist in making the connection between the flow-control package and connector 34." PO Resp. 75 (Ex. 2006 ¶¶ 125–128). Patent Owner also points to Mr. Herrmann's deposition testimony, noting that "Andersen does not explain how to guide the flow-control package onto the connector 34 even though [a person of ordinary skill in the art] could miss the connector altogether if only a few inches off." PO Resp. 74 (citing Ex. 2005 313:3–24 ("Q: You can miss the hub all together; right? You can be six inches away. A: Yes.")).

We disagree with Patent Owner. As discussed above with respect to anticipation by Kelly, we do not find that the recited tree body is limited to the vertical tubular member of the tree connected to the well head, as Patent Owner urges. See PO Resp. 12; *id.* at 73 (annotated Figure 4 of Andersen); see also Reply 25 n.5 ("Patent Owner errs to the extent it suggests that Andersen's connector 34 does not correspond to the claimed 'tree guide' because it is not a constituent part of the vertical tubular."). Patent Owner does not explain sufficiently why Andersen's hub connector 34 is not part of Andersen's tree body.

Further, Petitioner reiterates its explanation that, once engaged initially with hub connector 84, hub connector 34 "guides the remainder of the hub connector 84 onto the hub connector 34." Reply 25–26; Pet. 51. We note that claim 1 does not require a tree guide that itself prevents "miss[ing] the connector altogether." See PO Resp. 74. Petitioner also points to Mr. Herrmann's declaration testimony that such connector

elements “are undoubtedly necessary owing to the three or more flow paths that have to align perfectly to seal.” Reply 26 (citing Ex. 1003 ¶ 37); Pet. 51. Neither Patent Owner nor Mr. Boyadjieff persuasively rebuts Petitioner’s evidence. Moreover, we note that Andersen teaches that “[h]ub connector 84 contains *complementary* connector parts providing fluid tight couplings with the connector parts of the wellhead hub 34.” Ex. 1005, 13:3–4 (emphasis added). Given that the connector parts of hub connectors 34, 84 are complementary, we find that the hub connectors would guide each other for precise alignment of their respective connector parts to achieve a tight seal. Based on the record before us, we are persuaded that Andersen’s hub connector 34 teaches a “tree guide.”

Patent Owner further argues that “[Petitioner’s] inherency argument also fails because it presents no evidence, just conclusory statements, that it is necessary for a subsea connection to include a ‘tree guide’ that engages an ‘aligning member.’” PO Resp. 75. According to Patent Owner, “a tree guide is not necessary for all subsea connections because, often times, just one side of the connection, as shown in Andersen, contains a guide to assist in aligning the connection.” *Id.* Patent Owner relies on Mr. Boyadjieff’s declaration testimony to support its argument. *Id.* (citing Ex. 2006 ¶ 127).

We disagree with Patent Owner. Even if a tree guide is not necessary for all subsea connections, we are persuaded that Andersen’s hub connector 34 teaches a “tree guide” for the reasons given above.

Lastly, Patent Owner argues that “even if connector 34 is assumed to be a tree guide, which it is not, [Petitioner’s] alleged tree guide and alleged aligning member are not engageable because there is no interlocking or attachment between the two parts.” *Id.* at 76; *see also id.* (“Mr. Boyadjieff

testifies that POSA would not consider two pieces of equipment that deflect[] off' each other as being engageable because there is no interlocking between them, as required.”). According to Patent Owner, “two parts are ‘engageable’ if they ‘come together and interlock.’” *Id.* at 12, 76.

In response, Petitioner argues that Patent Owner’s understanding of the term “engageable” is “flawed.” Reply 27. Petitioner further notes that the ’076 patent describes embodiments with “non-interlocking engagements.” *Id.* In particular, Petitioner directs us to where the ’076 patent teaches that “[m]andrel 47 has a tubular lower portion with a flange 49 that abuts and seals to a mating flange on choke body 23” and that “[t]he **engagement** of guide members 37 and 67 provides fine alignment for mandrel 47 as it **engages** choke body 23.” *Id.* at 7–8 (citing Ex. 1001, 8:24–26, 10:28–31).

Given the cited teachings of the ’076 patent, we agree with Petitioner that the claims do not require the tree guide and aligning member to interlock. Indeed, as Petitioner points out, the ’076 patent explicitly teaches that the term “engages” encompasses the term “abuts.” *Id.*; Ex. 1001, 8:24–26, 10:28–30. As discussed above, Andersen teaches that hub connectors 34 and 84 have “complementary connector parts providing fluid tight couplings.” Ex. 1005, 13:3–4. Based on the record before us, we are persuaded that Andersen’s hub connectors 34 and 84 teach “an aligning member that is engageable with the tree guide.”

2. Other Disputed Limitations

Like claim 1, independent claim 6 recites “a tree body having . . . tree guide.” In addition, as discussed above, claim 1 further recites a “second

flowpath between the production bore, the processing apparatus, and the wing block.” Patent Owner argues that Andersen does not disclose these limitations or the limitations recited in dependent claims 7 and 8 based on the arguments that it presented previously. *See* PO Resp. 76–78. For the reasons give above, we are not persuaded by Patent Owner’s arguments.

In view of the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that Andersen anticipates claims 1 and 6–8. Having reviewed the parties’ arguments (*see* Pet. 34–35, 39–41, 52, 54; PO Resp. 78) as to whether Andersen anticipates claims 3 and 9, we also determine that Petitioner has demonstrated by a preponderance of the evidence that Andersen anticipates these claims.

IV. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that: (1) claims 1–3 are unpatentable under 35 U.S.C. § 102 as anticipated by Kelly; (2) claims 1–3 are unpatentable under 35 U.S.C. § 103 as obvious over Kelly and Andersen; (3) claims 1, 3, and 6–9 are unpatentable under 35 U.S.C. § 103 as obvious over Andersen, Hopper, and Kelly; and claims 1, 3, and 6–9 are unpatentable under 35 U.S.C. § 102 as anticipated by Andersen.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–3 and 6–9 of the ’076 patent are held to be *unpatentable*; and

FURTHER ORDERED that, because this is a Final Written Decision, 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.

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