

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 IPR2016-00378
Patent 8,272,435 B2

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

DEFRANCO, *Administrative Patent Judge*.

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

I. INTRODUCTION

OneSubsea IP UK Limited (“OneSubsea”) is the owner of U.S. Patent No. 8,272,435 B2 (“the ’435 patent”). FMC Technologies, Inc. (“FMC”) filed a Petition (Paper 2, “Pet.”) seeking *inter partes* review of claims 1–9 and 11–14 of the ’435 patent. We instituted *inter partes* review of all the challenged claims (Paper 7, “Inst. Dec.”) because FMC demonstrated a “reasonable likelihood” of prevailing on “at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

After institution, OneSubsea filed a Patent Owner Response (Paper 12, “PO Resp.”), and FMC followed with a Reply (Paper 17, “Pet. Reply”). With our authorization, OneSubsea filed a Sur-Reply in response to certain claim construction arguments raised by FMC’s Reply. Paper 23, “PO Sur-Reply.” Each party had an opportunity to present its case in a hearing conducted on March 29, 2017, a transcript of which is in the record. Paper 27 (“Tr.”).

We have jurisdiction over these proceedings under 35 U.S.C. § 6(b). After considering the evidence and arguments of the parties, we determine that FMC has proven by a preponderance of the evidence that claims 1–9 and 11–14 of the ’435 patent are unpatentable. *See* 35 U.S.C. § 316(e). We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a).

II. BACKGROUND

A. *The Related District Court Action*

The ’435 patent is involved in a concurrent district court case, *OneSubsea IP UK Limited v. FMC Technologies, Inc.*, Case No. 4:16-cv-00051 (S.D. Tex.), which commenced March 30, 2015, as transferred from Case No. 2:15-cv-00445 (E.D. Tex.). Paper 5. The district court case is

currently stayed pending resolution of this proceeding and three related proceedings.

B. The '435 Patent

The '435 patent relates to a subsea Christmas tree system for an oil or gas well. Ex. 1001, 1:51–58. Subsea Christmas trees are well known in the oil and gas well art, and comprise an assembly of pipes, valves, and fittings for controlling the flow of oil and gas from the wellhead to a production flow line. *Id.* The particular subsea Christmas tree at issue here includes a “diverter assembly” coupled to a “branch” of the tree for diverting fluid flow away from its “usual path” in the tree to a “processing apparatus,” followed by recovery and return of the processed fluid to a “branch outlet” for communication with the production flow line. *Id.* at 2:44–3:37, 4:5–52.

C. The Challenged Claims

FMC challenges claim 1–9 and 11–14 of the '435 patent. Of the challenged claims, only claim 1 is independent and recites:

1. A system, comprising:
 - a branch of a mineral extraction tubing, wherein the branch comprises a branch outlet; and
 - a diverter assembly coupled to the branch, wherein the diverter comprises a first fluid path to a diverter outlet and a second fluid path from a diverter inlet to the branch outlet.

Ex. 1001, 34:13–19.

D. The Instituted Grounds

In its Petition, FMC asserts eight grounds that include anticipation under 35 U.S.C. § 102 and obviousness under 35 U.S.C. § 103. Pet. 4–5. We instituted *inter partes* review on all the challenged claims, as well as on

all the asserted grounds. Inst. Dec. 8–9. The grounds on which we granted *inter partes* review are as follows.

Reference(s)	Basis	Claims Challenged
Kelly ¹	§ 102	1–8, 13
Kelly and Fenton ²	§ 103	8, 9
Kelly and Bednar ³	§ 103	1–8, 13
Kelly, Bednar, and Fenton	§ 103	8, 9
Clair ⁴	§ 102	1–8, 11–14
Clair and Fenton	§ 103	8, 9
Bednar	§ 102	1–8, 13
Bednar and Fenton	§ 103	8, 9

In support of these grounds, FMC 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), FMC demonstrated a “reasonable likelihood” of proving that “at least 1 of the claims challenged in the petition” is unpatentable, namely, claim 1. Inst. Dec. 4–8. 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.* at

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

² U.S. Pat. App. No. 2002/0070026 A1, pub. June 13, 2002 (Ex. 1005, “Fenton”).

³ U.S. Patent No. 5,010,956, iss. Apr. 30, 1991 (Ex. 1007, “Bednar”).

⁴ U.S. Patent No. 2,638,917, iss. May 19, 1953 (Ex. 1006, “Clair”).

6–7 (citing *Intex Recreation Corp. v. Bestway Inflatables & Material Corp.*, IPR2016-00180, Paper 13, at 8–11 (PTAB June 6, 2016)).

OneSubsea 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. 75–77. Citing 35 U.S.C. § 314, OneSubsea argues that “[t]he Board 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 77 (emphasis added). We disagree.

OneSubsea ignores the critical language of the statute. The statute does not require that the threshold for institution must be met for “the claims,” as OneSubsea 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 OneSubsea 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 a subset 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 a subset 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.” (Emphases 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.⁵ As such, 37 C.F.R. § 42.108(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 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 three groups along the lines of the primary reference asserted for each ground—the “Clair-based grounds,” the “Kelly-based grounds,” and the “Bednar-based grounds.” Inst. Dec. 4, 7. We analyzed the merits of claim 1 as challenged in each group and found that it met the “reasonable likelihood” threshold for institution. *Id.* at 6–8.

⁵ 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 at least one claim 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 6; *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 where the same reference forms the primary basis of the challenge. Inst. Dec. 6–7 (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)).

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 explained why each of

Clair, Kelly, and Bednar sufficed as proof of a reasonable likelihood of anticipation of claim 1. Inst. Dec. 4–6, 7–8. We then exercised our discretion under 37 C.F.R. § 42.108 to institute review on *all* claims challenged within those anticipation grounds. And, because each of Clair, Kelly, and Bednar forms the primary basis of FMC’s obviousness grounds, we exercised that same discretion to institute review of those grounds as well. *Id.* at 6–7. Our decision to streamline the institution proceeding by analyzing substantively only a subset 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 and true disclosure of the facts.” *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.*” *Rovalma, S.A. v. Bohler-Edelstahl Gmbh & Co. KG*, Appeal No. 2016-2233, slip op. at 14 (Fed. Cir. May 11, 2017) (emphasis added). Here, 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 to be resolved at trial. *See* Inst. Dec. 8–9 (“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

In an *inter partes* review, we give claim terms in an unexpired patent their broadest reasonable construction in light of the specification of the patent in which they appear. *Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under that standard, we ascribe claim terms their ordinary and customary meaning, as understood by a skilled artisan in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Our construction of claim terms “cannot be divorced from the specification and the record evidence.” *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015) (quoting *In re NTP, Inc.*, 654 F.3d 1279, 1288 (Fed. Cir. 2011)).

In its Petition, FMC does not propose any claim terms for construction. Pet. 6–7. OneSubsea, in turn, proposes a construction of three terms, relying primarily on constructions advanced in the related district court case. PO Resp. 8–11. FMC replies that two of the constructions proposed by OneSubsea are improper because they differ from what OneSubsea argued in the district court case and are narrower than the “broadest reasonable interpretation” mandated by our proceedings. Pet.

Reply 3–5; *see Cuozzo*, 136 S. Ct. at 2144–46. We address each of the claim terms in question as follows.

Claims 1, 3–6, 8, and 14 recite the term “diverter assembly.” The Petition addresses neither of these terms. Because OneSubsea raises them in its Patent Owner Response, we consider the proper construction of, first, the term “assembly,” and next, the term “diverter assembly.”

1. “assembly”

OneSubsea argues that the term “assembly” should be interpreted as “a *complete structure* composed of fitted together parts.” PO Resp. 8 (emphasis added). In support, OneSubsea proffers a general definition of “assembly” from Webster’s Dictionary—“the fitting together of manufactured parts into a complete machine, structure, or unit of a machine.” *Id.* (citing Ex. 2008, 69). OneSubsea also proffers a definition of “assembly” from an oil industry handbook—“A term to describe a number of special pieces of equipment fitted together to perform a particular function” *Id.* (citing Ex. 2007, 18).

FMC replies that OneSubsea’s proposed construction of “assembly” in this proceeding is “narrower” than the construction it advanced in the related district court action. Pet. Reply 3. There, OneSubsea represented that the term “diverter assembly” means simply “a multipart device for directing,” whereas now OneSubsea argues for a more comprehensive meaning—“a complete structure of fitted together parts for directing.” *Compare* Ex. 1021, 2–4 with PO Resp. 8–11. In that regard, FMC complains that OneSubsea is now attempting to interpret an “assembly” as a “unitary structure.” *Id.* We agree.

At the outset, we note that OneSubsea's citation from Webster's Dictionary leaves out the additional definition of "assembly" as "a collection of parts." Ex. 2008, 69. That definition is more in alignment with the one OneSubsea proffers from the oil industry handbook, which defines "assembly" as "a number of special pieces of equipment fitted together to perform a particular function" Ex. 2007, 18. Neither of those definitions requires that an "assembly" be a "complete structure," as OneSubsea now urges. Even OneSubsea's expert admitted that the term "complete" is an "arbitrary" term that adds nothing "about what [to] decide is going to be an assembly and what's not going to be an assembly." Ex. 1015, 80:1–5. As such, OneSubsea's addition of the term "complete" sheds no light on how a skilled artisan would have understood the relationship of parts that make up an "assembly." We reject OneSubsea's attempt now to construe the term more narrowly than it did in the district court action. As such, we construe "assembly" as "a multipart device."

2. *"diverter assembly"*

With respect to the term "diverter assembly," FMC argues it means "a multipart device *for directing*" because that was the interpretation OneSubsea proposed in the district court action. Pet. Reply 3 (citing Ex. 1021, 2–4) (emphasis added). OneSubsea argues the term should be construed as "a complete structure composed of fitted together parts *for directing fluid*." PO Resp. 8–10 (emphasis added). OneSubsea's construction, however, is premised on its previous construction of the term "assembly" as a "complete structure," which we have already rejected. Thus, the only remaining issue is construction of the term "diverter."

Both parties agree that the term “diverter” means “directing.” PO Resp. 10; Pet. Reply 5. We note that the district court construed the term “divert,” after conducting a *Markman* hearing, to mean “the direction of the fluid’s flow is forced to change from its current flowpath to a different flowpath.”⁶ Ex. 2012, 7. That construction is consistent with the plain and ordinary meaning of “divert” as “to turn in opposite directions . . . to turn aside : DEVIATE . . . to turn from one course or use to another : DEFLECT.” Ex. 3002 (Webster’s Dictionary). While the terms “forced” and “different flowpath” may not be necessary under our BRI⁷ standard, neither party explains why we should disregard the district court’s construction entirely. We view the parties’ proposed construction of “diverter,” i.e., “directing,” as unreasonably broad when viewed in the context of the claim and specification as a whole. Accounting for the district court’s construction, with an eye toward the BRI standard of our proceedings, we construe the term “diverter assembly” to mean “a multipart device that changes the course or direction of a fluid’s current flowpath.”

3. “branch”

Challenged claims 1–6, 13, and 14 recite the term “branch.” We note that, in a *Markman* ruling, the district court construed the term “branch” to mean “an offshoot from a flowpath such as the production bore or the annulus bore, but does not include the production bore or the annulus bore.” Ex. 2012, 7. That construction is consistent with the definition in the

⁶ The district court only had an opportunity to construe several but not all of the terms in dispute here before the case was stayed pending completion of our proceedings.

⁷ BRI stands for “broadest reasonable interpretation.”

specification of the '435 patent, which explains that “by ‘branch’ we mean any branch of the manifold, other than a production bore of a tree . . . typically a lateral branch of the tree.” Ex. 1001, 3:61–63. It is also consistent with the plain and ordinary meaning of the term—“a secondary shoot or stem (as a bough) arising from a main axis (as of a tree) . . . something that extends from or enters into a main body.” Ex. 3002 (Merriam-Webster’s Collegiate Dictionary). Accounting for the district court’s construction and keeping in mind the BRI standard of our proceedings, we construe the term “branch” to mean “an offshoot from a main flowpath or axis of a tree, such as a production bore or annulus bore, that encompasses but is not necessarily limited to a portion extending laterally from the main flowpath or axis.”

C. Obviousness Over Kelly and Bednar

FMC challenges independent claim 1 and dependent claims 2–8 and 13 as obvious over Kelly in view of Bednar. Pet. 25–31. FMC relies on Kelly to disclose all the elements of claim 1, with the exception of the limitation requiring “a diverter assembly coupled to the branch,” for which FMC relies on Kelly as modified by Bednar. *Id.*

1. Independent Claim 1

a. “a branch of mineral extraction tubing”

Claim 1 begins by reciting “a branch of mineral extraction tubing” connected to a well bore. FMC relies on annotated figure 1 of Kelly, shown below, to illustrate how Kelly discloses the “branch” element of claim 1.

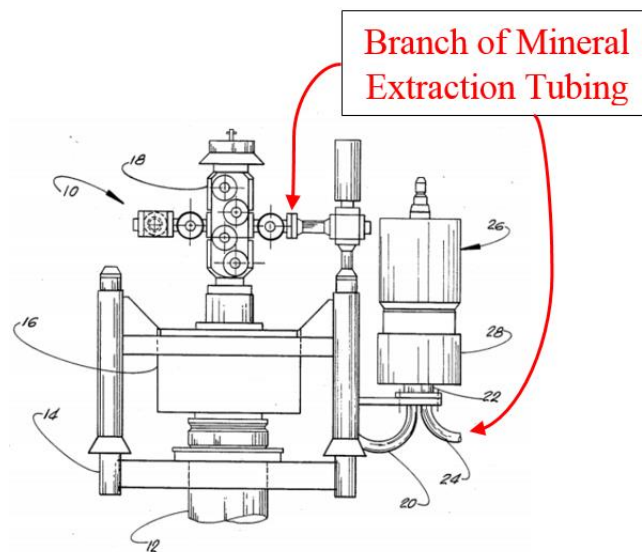


Fig. 1
Kelly, FIG. 1 (annotated)

Annotated figure 1 of Kelly depicts subsea tree 18 connected to a subsea wellhead 12. According to FMC, “line 20” and “line 24” of Kelly are a branch because they extend laterally outward from subsea tree 18 to the production “flowline (not shown)” at the terminus of line 24. Pet. 8–9 (citing Ex. 1004, 2:21–25, 2:58–62, Fig.1). FMC’s expert explains that branch line 20 provides a flow path from wellhead 12 to collet body 22, while branch line 24 provides a flow path from collet body 22 to the unseen production flowline at the end of branch line 24. Ex. 1003 ¶¶ 15–18.

FMC’s identification of Kelly’s lines 20 and 24 as a branch comports with our construction of the term “branch,” where subsea tree 18 comprises the main flowpath or axis of wellhead 12, and lines 20 and 24 comprise “an offshoot” that includes “a portion extending laterally from the main flowpath or axis.” Accordingly, we find that lines 20 and 24 represent a branch of Kelly’s subsea tree, thereby meeting the limitation of claim 1 reciting “a branch of mineral extraction tubing.”

b. “a branch outlet”

Claim 1 further recites “a branch outlet” for the branch. FMC relies on annotated figure 2 of Kelly, shown below, to illustrate where Kelly discloses the “branch outlet.”

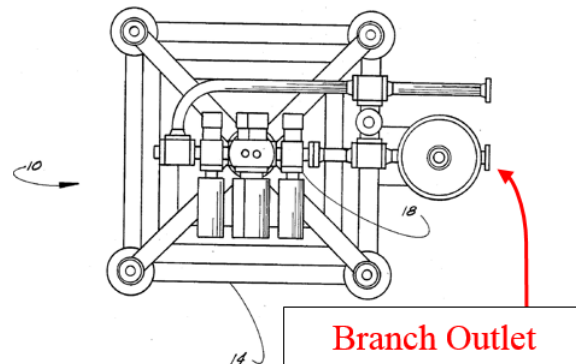


Fig. 2
Kelly, FIG. 2 (annotated)

Annotated figure 2 is a top view of Kelly’s subsea tree 18. Although Kelly does not identify expressly a branch outlet, FMC points to figure 2 and Kelly’s disclosure that “line 24 connects . . . to the subsea flowline (not shown).” Pet. 9 (citing Ex. 1004, 2:22–25). According to FMC, line 24 “necessarily includes” an outlet at the interface with the unseen flowline so that fluid may pass from one line into the other. *Id.* We agree. That branch line 24 must have an outlet is the natural inference arising from Kelly’s teaching. Accordingly, we find that Kelly’s subsea tree 18 includes “a branch” having “a branch outlet,” as required by claim 1.

c. “diverter assembly”

Central to this dispute is the “diverter assembly” of claim 1, which must be “coupled to the branch.” As claimed, the diverter assembly comprises “a first fluid path to a diverter outlet” and “a second fluid path

from a diverter inlet to the branch outlet.” Although claim 1 does not further describe the diverter assembly, the specification explains that:

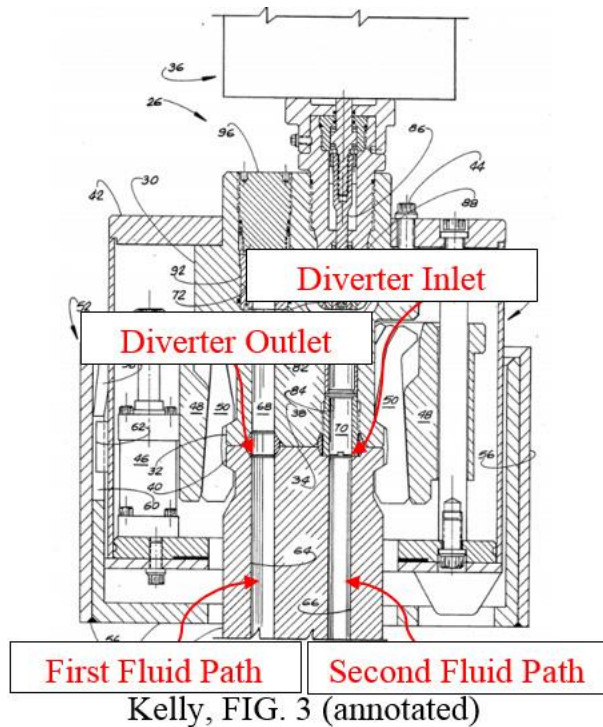
The diverter assembly could be located in a branch of the manifold (or a branch extension) in series with a choke. For example, in an embodiment where the manifold comprises a tree, the diverter assembly could be located between the choke and the production wing valve or between the choke and the branch outlet. Further alternative embodiments could have the diverter assembly located in pipework coupled to the manifold, instead of within the manifold itself. . . .

* * *

The invention provides the advantage that fluids can be diverted from their usual path between the well bore and the outlet of the wing branch.

Ex. 1001, 3:3–24.

FMC identifies Kelly’s “collet body 22” as meeting the claimed “diverter assembly.” Pet. 29. As shown above in annotated figure 1 of Kelly, collet body 22 is coupled between branch lines 20 and 24 and located in series with choke assembly 26. Ex. 1004, 2:22–25, Fig. 1. And, as shown below in annotated figure 3 of Kelly, collet body 22 has a first fluid path (“passage 64”) for directing fluid in a direction away from branch line 20 and a second fluid path (“passage 66”) for directing fluid in an opposite direction toward branch line 24. *Id.* at 2:58–65, Fig. 3.



Annotated figure 3 of Kelly, reproduced above, is a sectional view of collet body 22 connected in series with choke assembly 26. We construed a “diverter assembly” to mean “a multipart device that changes the course or direction of a fluid’s current flowpath.” In that regard, FMC explains that, “[r]ather than flowing directly from the ‘Christmas tree 18’ to the outlet of ‘line 24,’ the flow of fluids is turned, i.e., diverted, by ‘line 20’ and ‘collet body 22’ to flow into ‘subsea choke assembly 26,’ and fluids exiting ‘subsea choke assembly 26’ are returned by ‘collet body 22’ to the branch at ‘line 24.’” Pet. 9–10 (citing Ex. 1003 ¶ 17). We agree.

As illustrated in figures 1 and 3 of Kelly, fluids that would normally flow in a *direct* pathway from branch line 20 to branch line 24, and thereupon exit to the unseen production flowline at the outlet of line 24, instead are turned in a different direction to flow upward through choke assembly 26 before returning in an opposite direction and exiting through the outlet of branch line 24 to the production flowline. See Ex. 1003 ¶ 23

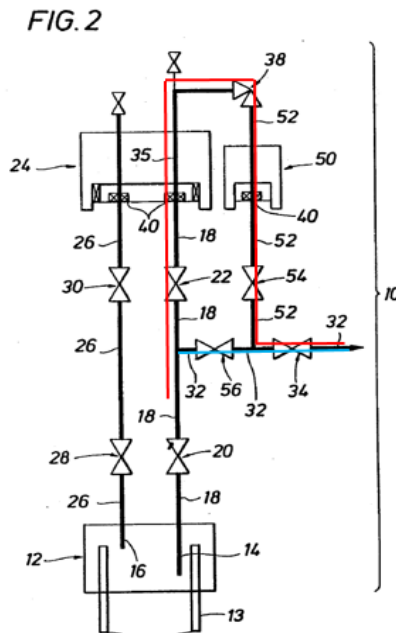
(“The separate flow paths of ‘collet body 22’ prevent direct flow between the branch inlet and the branch outlet by directing flow into ‘subsea choke assembly 26’ and from there to a portion of the branch near the end of ‘line 24’ in communication with the branch outlet.”). That evidence persuades us that Kelly’s collet body, which changes the path of the fluid to flow in opposite directions, is a “diverter assembly,” as properly construed.

Moreover, the diversion of the fluid from a direct pathway between branch lines 20 and 24 to a different pathway through Kelly’s collet body 22 is made clearer when Kelly is considered in the context of the modification taught by Bednar, as explained below.

Although Kelly’s collet body 22 may be a “diverter assembly” under the broadest reasonable interpretation of that claim limitation due to flowpath changing directions, FMC nonetheless acknowledges that Kelly’s system does not divert fluid “to flow directly” from branch line 20 to the outlet of branch line 24 without first passing through choke assembly 26. Pet. 11. For teaching that fluids may flow directly from Kelly’s branch line 20 to branch line 24 or, alternatively, be diverted away from branch line 20 to flow through choke assembly 26, FMC turns to Bednar. Pet. 29.

Like Kelly, Bednar teaches a “subsea tree assembly” having a retrievable choke. Ex. 1007, 2:55–3:2, 3:61–4:10, 4:58–5:17. More specifically, Bednar teaches an “improved design and piping arrangement [to] allow a choke to be incorporated into or removed from a subsea tree without requiring significant changes in an existing, typical tree design.” Ex. 1007, 2:57–61. In the “Background of Invention,” Bednar mentions “Kelly” as an existing design in which the choke can be “removed . . . without requiring the entire tree to be retrieved.” *Id.* at 1:42–55. While

Kelly only has a single flowpath through its removable choke, Bednar improves upon Kelly by providing a direct flowpath to the production flow line in the event the subsea choke experiences a failure. *Id.* at 5:7–11. As explained by Bednar, its “improved design offers a significant advantage” over Kelly and other removable chokes because it can “continue producing the well even after the choke experiences a failure, by isolating the failed choke from the main production flowstream.” *Id.* at 2:3–9. Bednar does this by providing alternative flowpaths from the wellhead to the production flowline, which, as illustrated below in annotated figure 2 of Bednar, includes either a direct path to the production flowline (shown in blue) or an indirect path through the choke before proceeding to the production flowline (shown in red).

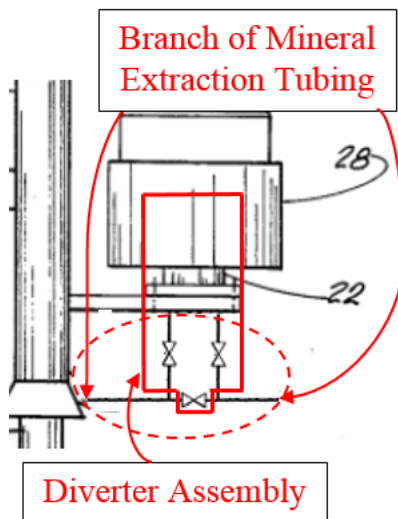


Bednar, FIG. 2 (annotated)

Annotated figure 2 of Bednar above depicts the alternative flowpaths within Bednar’s subsea tree assembly. In particular, fluid from wellhead 13 can take a direct path (shown in blue) from “tree flow passage 18” to

“production line 32” “directly through valves 20, 56, and 34,” or alternatively, fluid can be diverted along a different course (shown in red) through valve 22, choke assembly 38, “return line 52,” and valve 54 before returning to “production line 32.” *Id.* at 2:66–3:2, 3:33–40, 3:61–4:10, 4:58–5:17, Fig. 2; Ex. 1003 ¶ 32.

FMC argues that a skilled artisan would have readily modified the system of Kelly to add an alternative, direct flow path, as taught by Bednar, because “it was commonly known to provide a selectively accessible alternative flow path in parallel with a retrievable choke to allow fluid production without passing through the choke.” Pet. 27 (citing Ex. 1003 ¶¶ 32–33). Specifically, FMC’s expert testifies that a skilled artisan would have simply incorporated “an additional conduit and series of valves,” such as Bednar’s “production crown valve 22,” “hub isolation valve 54,” and “flow loop isolation valve 56,” between Kelly’s branch lines 20 and 24, so as to “allow[] fluid to flow directly to the flowline in the event ‘subsea choke assembly 26’ has failed.” Ex. 1003 ¶¶ 33–34. FMC submits an annotated figure, reproduced below, to illustrate how a skilled artisan would have modified Kelly’s branch lines 20 and 24 to provide a direct flow path to the production flowline, as taught by Bednar.



Kelly in view of Bednar,
FIG. 2 (annotated)

Annotated figure 2 above depicts Kelly’s modified system incorporating Bednar’s teaching of a direct flowpath to the production flowline. As shown, the branch of Kelly’s modified system provides either a direct flowpath to the production flowline or a diverted flowpath passing through collet body 22 in a first direction to choke assembly 26 before returning in a second direction through collet body 22 toward the branch. Ex. 1003 ¶¶ 34–36. As such, we find that Kelly as modified by Bednar discloses a “diverter assembly” in the manner recited by claim 1, including the claimed “first fluid path” and “second fluid path.”

d. FMC’s Reason to Combine

According to FMC, a skilled artisan would have undertaken to modify Kelly’s system with the direct flowpath taught by Bednar because Kelly recognized the problem of “high wear rates” in wellhead chokes, and Bednar expressly describes that an advantage of its dual flowpaths is to permit production “even after subsea choke 38 experiences a failure.” Compare Ex. 1004, 1:17–19 with Ex. 1007, 5:7–11; see also Ex. 1003 ¶ 34. In other

words, adding the additional flow path of Bednar would have enabled Kelly's system to continue to operate when the choke was worn or removed for replacement.

We find FMC's reason to combine persuasive. A skilled artisan would have been motivated to modify the system of Kelly with the direct flow path of Bednar because Bednar teaches expressly the benefit of having such a path in a subsea choke system. Ex. 1007, 5:5–17. And, given the simplicity of the structure of a direct flowpath, a skilled artisan would have reasonably expected to succeed in adding Bednar's direct flow path to the branch lines already found in Kelly. A simple modification of that sort would have resulted in increased production from the well, as confirmed by FMC's expert. Ex. 1003 ¶ 34. Accordingly, we find that a skilled artisan would have combined Bednar's teaching of a direct flowpath with Kelly's choke flowpath and that, as modified, Kelly's system discloses a “diverter assembly” that includes a “first fluid path” and “second fluid path” in the manner called for by claim 1.

e. OneSubsea's Arguments in Rebuttal

OneSubsea faults FMC's combination of Kelly and Bednar because (1) a skilled artisan would not have combined the references, and (2) the combination fails to teach the claimed “diverter assembly.” PO Resp. 50–62. We address each argument in turn.

In arguing that that a skilled artisan would not have combined Bednar with Kelly, OneSubsea asserts that the modification of Kelly's flowpath to include Bednar's direct flow path is “not a simple combination” because of Bednar's identification of the valves and piping in its arrangement of a subsea choke system. PO Resp. 51. We disagree. OneSubsea's focus on

labels disregards Bednar's broader suggestion of utilizing an alternative flowpath to maintain flow from the well bore in the event of a choke failure. Pet. 28. The combination would not require "reincorporating . . . components in Kelly at a different location when they already exist," as OneSubsea urges. See PO Resp. 51. OneSubsea's own expert admits that a valve has a particular name only because of its location, and just because valve 22 serves as a crown valve in Bednar would not constrain a skilled artisan to only see it as a crown valve in another context. Ex. 1015, 71:8–72:4. The same reasoning applies to Bednar's flow passage 18. Further, OneSubsea's expert illustrates that the selection of "pipes, valves, and fittings" to provide a flowpath is routine. Ex. 1015, 19:4–23.

Ultimately, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference, but rather what the combined teachings of those references would have suggested as a whole to the skilled artisan. *In re Keller*, 642 F.2d 413, 425, (CCPA 1981). Bednar expressly suggests an alternative, direct flowpath in parallel with a diverter flowpath such as Kelly's, even referencing Kelly in the process. Contrary to what OneSubsea argues, we find persuasive the testimony of FMC's expert that a skilled artisan would have easily understood the appropriate "pipes, valves, and fittings" necessary to create such a direct flowpath in Kelly without undue experimentation. See Ex. 1003 ¶¶ 32–35.

OneSubsea next argues that a skilled artisan would not incorporate Bednar's alternative flowpath into Kelly's system because "Kelly teaches away from operating its system without a choke." PO Resp. 54. According to OneSubsea, "Kelly's system is designed to *always* operate with a choke"

in order “to permit the combination of each well’s production flowlines into a single, subsea gathering flowline.” *Id.* In support of this argument, OneSubsea relies on the testimony of its expert that a skilled artisan “would not be motivated to build a flow path around Kelly’s choke, because when the choke needed to be replaced, Kelly’s well would have been shut down and the choke retrieved to the surface.” *Id.* at 55 (citing Ex. 2006 ¶¶ 115–116).

We do not find the testimony of OneSubsea’s expert persuasive because Kelly states, at the outset, that the purpose of its retrievable choke is to avoid “the time and expense involved in ‘killing’ the well and retrieving the tree.” Ex. 1004, 1:13–17. Nowhere does OneSubsea’s expert address Kelly’s express disclosure of using “redundant pressure containing valves” to avoid turning off the well when the choke is in need of repair. *See id.* Nor does OneSubsea’s expert address Kelly’s express recognition that, depending on the well, different arrangements of flowlines “would be routed from the subsea tree, along the ocean floor, to a gathering ship or platform.” *See id.* at 1:20–24. In that regard, Kelly recognizes that “since various wells in a given field may not all have the same pressure[,] their production cannot be commingled into one flow line.” *Id.* at 1:24–27. Although Kelly mentions one advantage of its choke assembly is that it can be used where wells are comingled into a “single gathering line” (*id.* at 1:35–40), Kelly never forecloses its use in a multiple gathering system where flowlines “cannot be comingled” (*id.* at 1:24–27). In other words, Kelly leaves open the possibility of using its retrievable choke in either a single line gathering system or a multiple line gathering system. OneSubsea’s expert never addresses Kelly’s recognition of the latter type of system. As such, we are

not persuaded by his testimony that Kelly's system has no need for an alternative path because it would have been shut down.

OneSubsea argues that Bednar "explicitly rejected" the idea of its alternative flowpath being used with Kelly's system. PO Resp. 55–56. We disagree, as the evidence indicates otherwise. In the "Background of Invention," Bednar discusses two prior art subsea trees, one by "Kelly" and another by "Lochte," in which the choke assembly can be "removed . . . without requiring the entire tree to be retrieved." Ex. 1007, 1:42–55. Bednar then concludes that its "improved design offers a significant advantage" over those prior art subsea chokes because it can "continue producing the well even after the choke experiences a failure, by isolating the failed choke from the main production flowstream." *Id.* at 2:3–9; *see also id.* at 5:7–17 ("the advantages of the arrangement shown in FIG. 2 is that the wellbore may be produced through tree assembly 10 even after subsea choke 38 experiences a failure."). We do not view Bednar's disclosure as discouraging its combination with Kelly. Certainly Bednar finds fault with Kelly's system, but Bednar offers a solution—"isolating the failed choke from the main production flowstream." *Id.* at 2:3–9. In that regard, a skilled artisan would have understood Bednar to be suggesting application of his solution to the only two retrievable choke assemblies mentioned in the background of invention, namely Kelly and Lochte. Thus, we find that Bednar's solution has clear application to Kelly and that a skilled artisan would have viewed it as such.

OneSubsea next argues that Kelly and Bednar fail to disclose the claimed "diverter assembly" because their "individual components are neither a complete structure nor are they fitted together." PO Resp. 56. That

argument hinges on OneSubsea's proposed construction of the term "assembly," which we rejected as discussed above. *See supra* section III.B.1. In any event, OneSubsea mischaracterizes FMC's combination of Kelly and Bednar as "arbitrarily designating several individual, unconnected parts" to be an assembly. PO Resp. 56. In doing so, OneSubsea focuses on the *entire* arrangement of parts making up Bednar's system, without ever addressing FMC's actual assertion of combining simply the few parts making up Bednar's alternative flow path with Kelly's clear disclosure of a complete and integral assembly of fitted together parts. *Id.* at 56–59. OneSubsea ignores that a skilled artisan would have understood the importance of maintaining the integrity and relationship of Kelly's assembly when incorporating Bednar's alternative flow path, as attested to by FMC's expert. Ex. 1003 ¶¶ 34–35. Accordingly, we reject OneSubsea's argument that a skilled artisan would not have understood how to combine Kelly and Bednar to form a "diverter assembly" in the manner recited by claim 1.

Finally, OneSubsea argues that even if Kelly discloses a diverter assembly, it is not "coupled to the branch," as required by claim 1. PO Resp. 59–62. According to OneSubsea, Kelly's diverter assembly is "attached to flowlines 20 and 24 and not the branch of Kelly's tree because they extend outside the subsea tree." *Id.* at 36. First, that argument is premised on Kelly's lines 20 and 24 not comprising a "branch." In the related district court action, both parties agreed that the term "branch" is properly construed to mean "an offshoot from a flowpath such as the production bore or the annulus bore, but does not include the production bore or the annulus bore." Ex. 2012, 7. That construction is consistent with the specification of the '435 patent, which equates a "branch" to a "branch

extension” or “pipework coupled to the manifold, instead of within the manifold itself.” Ex. 1001, 3:3–10. In other words, the “branch” is not limited necessarily to the confines of the manifold or main axis of the tree, but may encompass pipework coupled to the manifold or tree. Here, Kelly’s lines 20 and 24 comprise a branch because they are pipework coupled to and extending from subsea tree 18. Ex. 1004, Fig. 1. Thus, we find that a skilled artisan would have considered Kelly’s lines 20 and 24 to be branches of subsea tree 18, to which Kelly’s collet body 22, i.e., diverter assembly, is coupled.⁸

In sum, we determine that the preponderance of the evidence weighs in favor of FMC’s case that claim 1 is unpatentable for obviousness over Kelly and Bednar.

2. *Dependent Claims 6 and 7*

Claims 6 and 7 require that “a part of the diverter assembly is sealed inside the branch to block fluid communication between two separate regions of the diverter assembly.” FMC points to Kelly’s modified system and the incorporation of Bednar’s “flow loop isolation valve 56” as the part

⁸ We also reject OneSubsea’s argument that lines 20 and 24 of Kelly cannot be a branch “because they extend outside the subsea tree.” PO Resp. 36; see also *id.* at 39 (“they are pipelines extending outside the tree”). According to OneSubsea, Kelly’s tree is defined by guideposts 14. *Id.* at 40–44. We disagree. Kelly states that “adjustable chokes could be installed directly onto the subsea trees” and identifies collet body 22 as the place where choke 26 is installed. Ex. 1004, 1:35–36. That Kelly’s choke is installed on collet body 22, which lies outside of guide posts 14, runs counter to OneSubsea’s definition of the bounds of a tree. *Id.*, Figs. 1, 2 (depicting collet body 22 outside of frame 14). As such, OneSubsea does not persuade us that Kelly’s branch lines 20 and 24 are not part of tree 18.

of the diverter assembly that blocks the flow of fluid between separate regions. Pet. 30–31; *see also* Ex. 1004, Fig. 3. This is the same as the ’435 patent’s disclosure of a valve as part of the diverter assembly—“fluids . . . cannot pass into through [sic] the wing branch 1114 *because of the V2 valve which is closed, and they are instead diverted* into the cap 1140.” Ex. 1001, 30:65–31:1.

OneSubsea responds that neither Kelly nor Bednar teaches that valve 56 would have been “sealed inside the branch.” PO Resp. 63. We disagree. As described expressly in Bednar, the assembly of “passages and valves” direct fluids along flowpaths that utilize “sealing devices suitable for . . . subsea environments.” Ex. 1007, 3:50–65. Like Bednar, Kelly also discloses “suitable sealing means” for maintaining sealed communication between various connections. *See, e.g.*, Ex. 1004, 2:61–65. Those disclosures persuade us that a skilled artisan would have appreciated the importance of fluid tight connections in a subsea environment and thus would have equipped the flow loop isolation valve in Kelly’s modified system with sealing devices to prevent fluid leakage between the separate regions. This would have been the natural inference arising from the teachings of both Kelly and Bednar. As such, we determine that FMC has shown by preponderant evidence that claims 6 and 7 are unpatentable for obviousness over Kelly and Bednar.

3. *Dependent Claim 8*

Claim 8 depends from claim 2 and requires that the diverter assembly is “connected to a processing apparatus.” FMC identifies Kelly’s choke assembly 26 as a processing apparatus. Pet. 20–21, 31. As described in Kelly, choke 26 is removably mounted between opposing pathways 64 and

66 in the diverter assembly and includes valve member 80 “to control the flow of production fluids therethrough.” Ex. 1004, 1:43–59, 2:66–3:9, Fig. 3. FMC’s expert explains that valve member 80 “processes fluid by affecting fluid flow and pressure” as fluid flows through choke 26. Ex. 1003 ¶ 26.

OneSubsea responds that the ’435 patent discusses chokes and processing apparatus “separately” and “never states that a choke is a type of processing apparatus.” PO Resp. 48–49 (citing Ex. 1001, 23:4–6). Relying on the testimony of its expert, OneSubsea 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,” but “[a] choke does not provide any ‘processing’ functions.” *Id.* at 49 (citing Ex. 2006 ¶¶ 106–108).

We are not persuaded by OneSubsea’s arguments. Although the ’435 patent may refer to a choke and a processing apparatus separately, OneSubsea does not direct us to any language in the ’435 patent, or any other evidence for that matter, that precludes a choke from being a processing apparatus. On the other hand, FMC points to credible testimony from both its expert and OneSubsea’s expert showing that Kelly’s choke is a processing apparatus. Pet. Reply 15. For instance, FMC’s expert explains that Kelly’s choke assembly 26 is a processing apparatus because it “processes fluid by reducing fluid flow and pressure” between the well bore and the production flowline. Ex. 1003 ¶ 26. OneSubsea’s expert likewise agrees that Kelly’s choke acts to regulate pressure—“it’s adjusting the choke which in turn will change your pressure of the well control, the pressure of the well.” Ex. 1016, 138:22–139:2. Given the agreement of both experts that Kelly’s choke has an effect on pressure, we are persuaded that Kelly’s

choke equates to the claimed “processing apparatus.” As such, we determine that claim 8 is unpatentable for obviousness over Kelly and Bednar.

4. *Dependent Claims 3–5 and 13*

Like claim 1, FMC argues that the dependent limitations of claims 3–5 and 13 would have been obvious over the combination of Kelly and Bednar. Pet. 29–31. OneSubsea does not argue these dependent limitations separately from claim 1.⁹ Nor does OneSubsea dispute FMC’s evidence of obviousness with respect to claims 3–5 and 13, except to argue they are patentable for “at least the reasons set forth above for independent claim 1.” PO Resp. 57. We have considered fully the evidence and arguments presented by FMC explaining how Kelly and Bednar teach each of the dependent limitations, and why a skilled artisan would have combined their teachings in the manner asserted. See Pet. 15–19 (citing Ex. 1003 ¶¶18–22), 28–30 (reason to combine), 33–35 (citing Ex. 1003 ¶¶ 37–40). We adopt FMC’s reasoning as our own. Thus, we determine that the preponderance of the evidence shows that dependent claims 3–5 and 13 are unpatentable for obviousness over Kelly and Bednar.

D. *Obviousness Over Kelly, Bednar, and Fenton*

FMC further argues that claims 8 and 9 are unpatentable for obviousness over Kelly, Bednar, and Fenton. Pet. 31–32. As discussed above, claim 8 recites that the diverter assembly is “connected to a

⁹ OneSubsea also includes claims 6–8 within this argument, however, we recognize that OneSubsea argues these claims separately from claim 1, as discussed previously.

processing apparatus.” Claim 9, which depends from claim 8, further defines the processing apparatus by providing a number of examples.

FMC relies on Fenton as teaching that processing apparatuses were “commonly used” in subsea wellhead installations. *Id.* at 23. For example, Fenton describes a choke assembly that includes one or more temperature and pressure measurement devices (sensors) to monitor fluid flow such that the choke could be appropriately adjusted. Ex. 1005, Abstract, [03], [05]–[07], [11]–[14]. FMC’s expert testifies that a skilled artisan would have modified Kelly’s choke assembly to include a pressure, temperature, or flow sensor, as taught by Fenton, or would have simply substituted Kelly’s choke assembly with Fenton’s choke module, which is already equipped with such sensors. Ex. 1003 ¶¶ 27–31, 38.

OneSubsea does not dispute FMC’s evidence and arguments that claims 8 and 9 would have been obvious over Kelly, Bednar, and Fenton, except to rely on “the reasons discussed above with respect to Kelly in view of Bednar.” PO Resp. 64–65; *see also* Pet. Reply 21. We have considered fully the evidence and arguments presented by FMC explaining how Kelly, Bednar, and Fenton teach the limitations of claims 8 and 9, and why a skilled artisan would have combined their teachings in the manner asserted. *See* Pet. 22–25 (citing Ex. 1003 ¶¶ 27–31). We find FMC’s reasons persuasive and adopt them as our own. Accordingly, we determine that FMC has shown by a preponderance of the evidence that dependent claims 8 and 9 are unpatentable for obviousness over Kelly, Bednar, and Fenton.

E. Anticipation by Clair

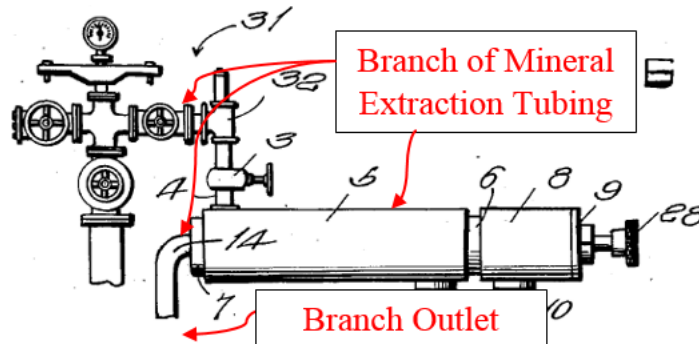
FMC challenges the patentability of claims 1–8 and 11–14 as anticipated by Clair. Pet. 32–47. Independent claim 1, from which all the

other challenged claims depend, requires a “mineral extraction tubing” that includes a “branch” coupled to a “diverter assembly.” Ex. 1001, 34:13–19. As claimed, the diverter assembly comprises a “first fluid path” that diverts fluid away from the branch and a “second fluid path” that returns fluid to a “branch outlet.” *Id.* at 34:16–19. We address each of the limitations of claim 1 as follows.

1. *Independent Claim 1*

a. *“a branch of mineral extraction tubing”*

For this claim limitation, FMC relies on Clair’s disclosure of a “reduction choke” for a “Christmas tree of an oil or gas well” and introduces annotated figure 6 of Clair, shown below, to illustrate the disclosure of the branch in Clair’s Christmas tree. Pet. 32–33 (citing Ex. 1006, 1:41–43, 2:29–31, Fig. 6).



Clair, FIG. 6 (annotated)

Annotated figure 6 above depicts the piping and valve arrangement of Clair’s tree. According to FMC, the “branch” is shown by the piping that extends laterally from the main vertical axis of Christmas tree 31 and comprises “connection 32,” “inlet 4,” and “cylindrical warming chamber 5” before terminating with “discharge pipe 14.” Pet. 33 (citing Ex. 1006, 3:38–4:23; 5:52–6:32; Ex. 1003 ¶ 40). As shown, Clair’s branch is substantially similar to the branch in figure 22 of the ’435 patent at issue here in that both

depict a fluid flow path extending laterally from a vertical main axis of the wellhead and leading to a cylindrical chamber of coaxial flow paths for further processing of the fluid. *Compare* Ex. 1001, Fig. 22 *with* Ex. 1006, Figs. 6, 7. While the tubular chamber in Clair is positioned horizontally and the tubular chamber in the '435 patent is positioned vertically, that difference does not change the fact that both comprise a branch or offshoot from the main axis of the wellhead. As such, we find that Clair discloses “a branch of mineral extraction tubing” in the manner recited by claim 1.

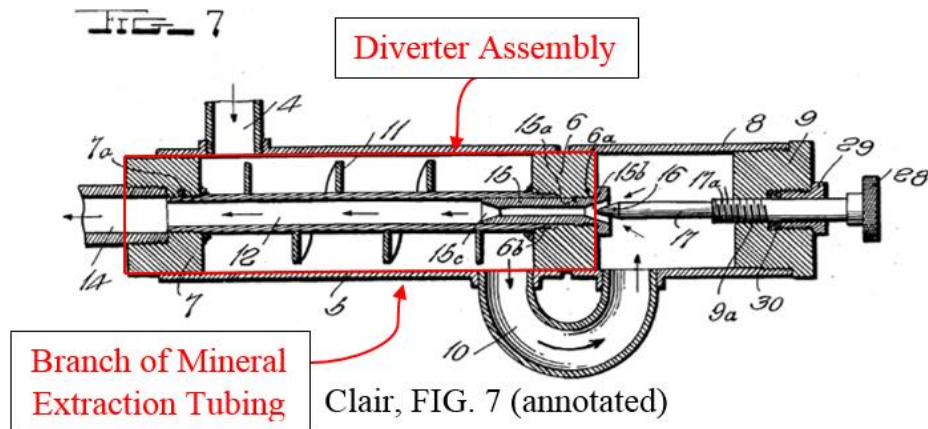
b. “wherein the branch comprises a branch outlet”

Claim 1 further recites “a branch outlet” for the branch. For this limitation, FMC identifies “discharge pipe 14” at the end of cylindrical warming chamber 5, which Clair describes as “lead[ing] to the separator or the storage tanks” for recovery of processed fluids. Pet. 33–34 (citing Ex. 1006, 4:5–8) (emphasis added). According to FMC, the discharge pipe necessarily includes an outlet such that fluid may be discharged into “the separator or the storage tanks.” *Id.* at 34. We agree. As shown in annotated figure 6 above, the discharge pipe has an outlet that accommodates fluid flow from Clair’s cylindrical chamber 5 to the unseen separator or storage tanks. Accordingly, we find that Clair’s disclosure of discharge pipe 14 meets the claim limitation of “a branch outlet.”

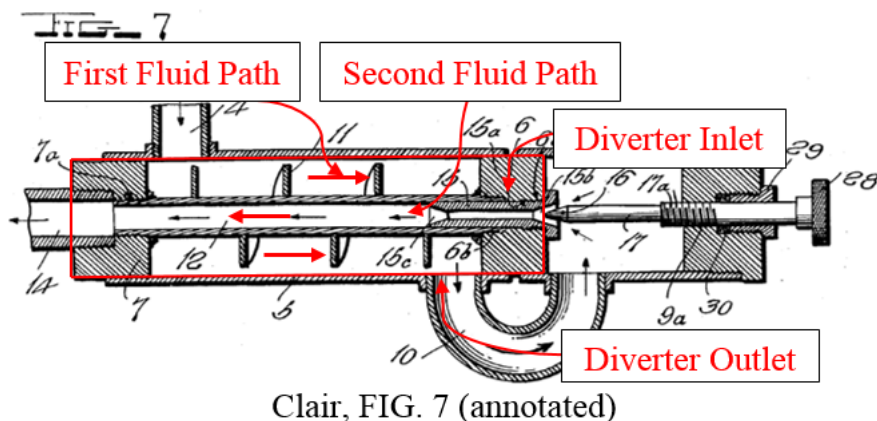
c. “a diverter assembly coupled to the branch,”

Claim 1 further recites “a diverter assembly coupled to the branch.” As claimed, the diverter assembly comprises “a first fluid path to a diverter outlet” and “a second fluid path from a diverter inlet to the branch outlet.” Ex. 1001, 34:16–19. For this limitation, FMC relies on annotated figure 7 of Clair, reproduced below, and argues that Clair’s diverter assembly is

provided by at least a portion of “warming chamber 5,” “coupling 6,” and “tubular expansion chamber 12.” Pet. 34–35 (citing Ex. 1006, 5:75–6:32; Ex. 1003 ¶¶ 41–42).



Annotated figure 7 above illustrates the portion of Clair’s branch comprising a diverter assembly. As shown, the flow of oil and gas is diverted from “inlet connection 4” along a spiral path of the branch to “choke cylinder 8” via “tube turn 10” and returns to the branch in an opposite direction along a narrower path through “tubular expansion chamber 12” to “discharge pipe 14.” Ex. 1006, 4:74–5:15. In that regard, FMC provides a further annotation of figure 7 to illustrate specifically Clair’s disclosure of the claimed “first fluid path to a diverter outlet” and “second flow path from a diverter inlet.”



Annotated figure 7 depicts the first and second flow paths of Clair's diverter assembly. As shown, Clair provides a first fluid path in an annular passage between the portion of the branch formed by "cylindrical warming chamber 5" and "tubular expansion chamber 12," and a second fluid path through a narrower central passage within "tubular expansion chamber 12." Clair's disclosure of first and second flow paths is no different than the claimed flow paths defined in claim 14, which depends from claim 1—"the diverter assembly comprises a tubular insert disposed inside a wall of the branch, an interior of the tubular insert defines the second fluid path, and an annular space between an exterior of the tubular insert and the wall defines the first fluid path." Ex. 1001, 34:59–63. Accordingly, we find that Clair discloses a "diverter assembly" and "fluid path" arrangement in the manner required by claim 1.

d. OneSubsea's Arguments in Rebuttal

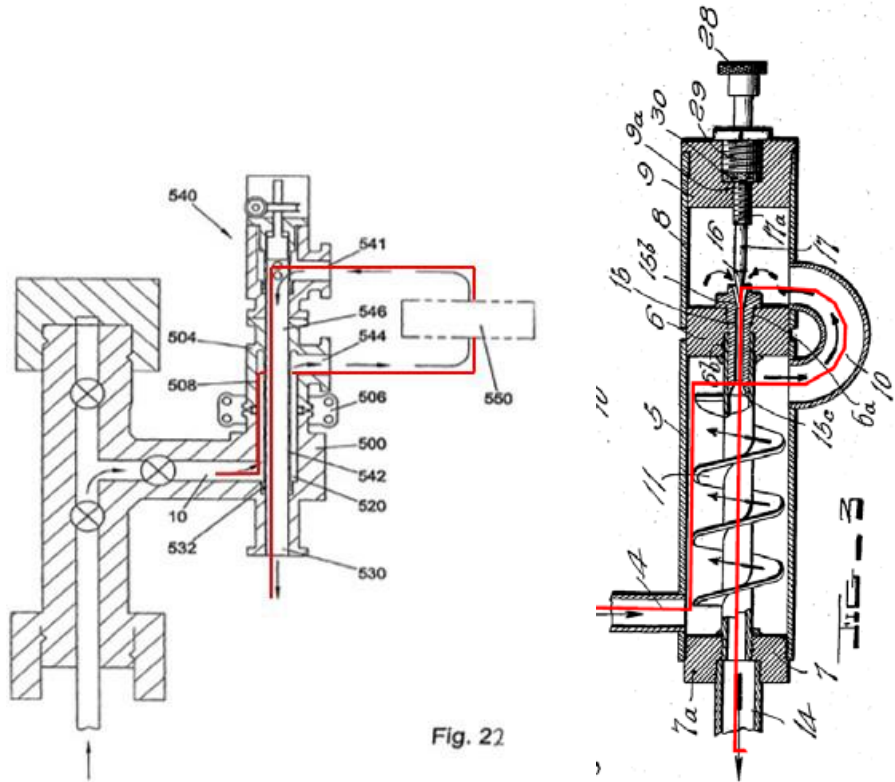
FMC persuades us that Clair's oil and gas flow system meets each and every element of claim 1. We are not persuaded by OneSubsea's contention that Clair does not describe a "second fluid path from a diverter inlet to the branch outlet." PO Resp. 65–67. According to OneSubsea, claim 1 requires the diverter assembly "to be installed mid-branch, *i.e.*, prior to the branch outlet," whereas Clair's diverter assembly "is attached to the branch outlet." *Id.* at 65. We disagree. OneSubsea's contention that Clair does not teach the "second fluid path" limitation is premised on a misrepresentation of the location of Clair's branch outlet. What OneSubsea purports to be a "Branch Outlet" in figure 6 of Clair is actually identified as an "inlet" by Clair. PO Resp. 66 (labeling element 4 in Clair's Fig. 6 as "Branch Outlet"). More specifically, Clair states that "gas and/or oil at 2000 lbs., or more, bottom

hole pressure, *enters inlet connection 4* at one side of the end of cylindrical warming chamber 5 and is directed in a spiral path around tubular expansion chamber 12 . . . from which the flow is directed into discharge pipe 14.” Ex. 1006, 4:74–5:15 (emphasis added). Thus, we are not persuaded by OneSubsea’s attempt to characterize element 4 of Clair as an outlet when the reference itself calls it an “inlet,” and, indeed, identifies a different element, “discharge pipe 14,” as the outlet of the branch. And figure 6 of Clair shows clearly that the flow path comprising Clair’s branch is positioned before discharge pipe 14, not after it, as OneSubsea urges.

Equally unpersuasive is OneSubsea’s argument that “FMC’s expert unequivocally stated that Clair’s choke and warming chamber assembly is attached to the branch outlet at the end of pipe 4.” PO Resp. 66. That argument is a non-starter for the simple reason that the testimony on which it is based was in response to a hypothetical that modified Clair in manner that removed the key feature of Clair’s invention, namely, the warming chamber that includes the choke, as well as the first and second flow paths, for the oil and gas. *See id.* at 66–67 (citing Ex. 2005, 299–300, and the response of FMC expert to the question: “If Clair’s invention were not incorporated into the manifold [of] Figure 6 . . .”). In other words, FMC’s expert was not testifying about what Clair actually discloses but rather some proposed modification that took the expert’s response outside the context of Clair’s invention.

Finally, we reject OneSubsea’s argument that a skilled artisan “would not consider Clair’s choke to be part of Clair’s Christmas tree.” PO Resp. 67. Claim 1 is directed to “a branch of mineral extraction tubing” and does

not recite a “tree.” As illustrated below, Clair depicts a branch in substantially the same manner as the claimed invention of the ’435 patent.



'435 Patent, Fig. 22 (annotated)

Clair, Fig. 3 (annotated)

Each of the above figures depicts the flowpath (red) of an oil and gas system comprising a branch of mineral extraction tubing coupled to a diverter assembly. OneSubsea fails to explain credibly why pipe 10 and coaxial flowpaths 520, 542, which lead to choke 540 and outlet 530, comprise a branch in the '435 patent at issue, while the substantially same configuration comprising inlet connection 4 and the coaxial flowpaths of cylindrical chamber 5, which likewise lead to choke 8 and discharge pipe 14, in Clair's system is not a branch. Ultimately, given the substantial similarity between the flowpath configurations of Clair and the '435 patent, we are not persuaded by OneSubsea's argument that Clair's diverter assembly is

somehow located after the branch outlet while the claimed diverter assembly is not. Thus, we find that Clair discloses “a second fluid path from a diverter inlet to the branch outlet,” as claimed.

In sum, we are persuaded that FMC’s Petition provides full and adequate support, through annotated figures and a detailed claim chart, of how claim 1 reads on Clair. Pet. 32–37; Ex. 1003 ¶¶ 39–52. Thus, we determine that FMC has demonstrated by a preponderance of the evidence that Clair anticipates claim 1 of the ’435 patent.

2. *Dependent Claims 2–8 and 11–14*

FMC argues that, like claim 1, dependent claims 2–8 and 11–14 are also anticipated by Clair. Pet. 37–44. OneSubsea does not argue these dependent limitations separately from claim 1. Nor does OneSubsea dispute FMC’s evidence and arguments that these dependent limitations are anticipated by Clair, except to argue they are patentable for “at least the reasons set forth above for independent claim 1.” PO Resp. 67. We have considered fully the evidence and arguments presented by FMC explaining how Clair anticipates each of the dependent limitations of claims 2–8 and 11–14. See Pet. 37–44 (citing Ex. 1003 ¶¶ 41–52). We find FMC’s analysis persuasive and adopt it as our own. Accordingly, we determine that the preponderance of the evidence shows that dependent claims 2–8 and 11–14 are unpatentable as anticipated by Clair.

F. *Obviousness Over Clair and Fenton*

FMC argues that claims 8 and 9 are unpatentable for obviousness over Clair and Fenton. Pet. 44–47. As discussed earlier with respect to the Kelly-based grounds, claim 8 recites that the diverter assembly is “connected

to a processing apparatus.” Claim 9, which depends from claim 8, lists a number of examples of processing apparatuses.

FMC relies on Fenton as teaching that processing apparatuses were “commonly used” in subsea wellhead installations. Pet. 45. For example, Fenton describes a choke assembly that includes one or more temperature and pressure measurement devices (sensors) to monitor fluid flow such that the choke could be appropriately adjusted. Ex. 1005, Abstract, [03], [05]–[07], [11]–[14]. FMC’s expert testifies that a skilled artisan would have modified Clair’s choke to add a pressure, temperature, or flow sensor, as taught by Fenton, because Clair recognized expressly the problems associated with “accumulation of frost and ice” and “reduction of pressure and temperature in oil and gas well systems.” Ex. 1003 ¶¶ 54–55 (citing Ex. 1006, 2:46–3:37).

OneSubsea does not dispute FMC’s evidence and arguments that claims 8 and 9 would have been obvious over Clair and Fenton, except to rely on “the reasons discussed above with respect to Clair.” PO Resp. 68; *see also* Pet. Reply 25. We have considered fully the evidence and arguments presented by FMC explaining how Clair and Fenton teach each of the limitations of claims 8 and 9, and why a skilled artisan would have combined their teachings in the manner asserted. *See* Pet. 44–47 (citing Ex. 1003 ¶¶ 53–55). We find FMC’s reasons persuasive and adopt them as our own. Accordingly, we determine that the preponderance of the evidence shows that dependent claims 8 and 9 are unpatentable for obviousness over Clair and Fenton.

IV. CONCLUSION

After considering the evidence and arguments presented in the Petition and Response, as well as the Reply and Sur-Reply, we determine that FMC has demonstrated by a preponderance of the evidence that claims 1–9 and 11–14 of the '435 patent are unpatentable. Because all the challenged claims are unpatentable over Clair alone and in combination with Fenton, and many of the same claims are also unpatentable over the combination of Kelly, Bednar, and Fenton, we need not reach FMC's other grounds for unpatentability of these claims.

V. ORDER

Accordingly, it is hereby:

ORDERED that claims 1–9 and 11–14 of the '435 patent are *unpatentable*;

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