

United States Court of Appeals for the Federal Circuit

G. DAVID JANG, M.D.,
Plaintiff-Appellant

v.

**BOSTON SCIENTIFIC CORPORATION, SCIMED
LIFE SYSTEMS, INC., NKA BOSTON SCIENTIFIC
SCIMED, INC.,**
Defendants-Cross-Appellants

2016-1275, 2016-1575

Appeals from the United States District Court for the
Central District of California in No. 5:05-cv-00426-VAP-
MRW, Judge Virginia Anne Phillips.

Decided: September 29, 2017

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DC, argued for plaintiff-appellant. Also represented by
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MATTHEW WOLF, Arnold & Porter Kaye Scholer LLP, Washington, DC, argued for defendants-cross-appellants. Also represented by EDWARD HAN, JOHN NILSSON.

Before PROST, *Chief Judge*, O'MALLEY and CHEN, *Circuit Judges*.

CHEN, *Circuit Judge*.

This dispute between G. David Jang, M.D. (Dr. Jang) and Boston Scientific Corp. and Scimed Life Systems, Inc. (collectively, BSC), more than a decade old, returns to us for a fourth time. In the latest appeal of this case involving U.S. Patent No. 5,922,021 ('021 Patent) and BSC's sales of several coronary stents (collectively, Express stent), Dr. Jang challenges the district court's denial of his motion for judgment as a matter of law (JMOL) on the ground that no reasonable jury could have found that BSC's Express stent did not literally infringe claims 1 and 8 (the asserted claims) of the '021 Patent. Dr. Jang also challenges the district court's vacatur of the jury's finding that the Express stent infringed the asserted claims under the doctrine of equivalents, as well as the entry of judgment of non-infringement in favor of BSC, on the ground that the district court incorrectly held that he failed to provide an acceptable hypothetical claim for an ensnarement analysis, and thereby failed to prove that his doctrine of equivalents theory did not ensnare the prior art. Dr. Jang's appeal is accompanied by a purported cross-appeal from BSC, which assigns error to the district court's holding that BSC was contractually obligated to pay royalties for past sales of the Express stent if it infringed the asserted claims, notwithstanding the U.S. Patent and Trademark Office's (PTO) eventual cancellation of them in an ex parte reexamination.

Because we *affirm* the district court's denial of Dr. Jang's motion for JMOL, its vacatur of the jury verdict of

infringement under the doctrine of equivalents, and its entry of judgment of non-infringement, we *dismiss* BSC's cross-appeal and need not reach the arguments it raised.

INTRODUCTION

A. The '021 Patent

Dr. Jang is the named inventor of the '021 Patent, which is generally directed to a coronary stent. A representative embodiment of the claimed stent is below.

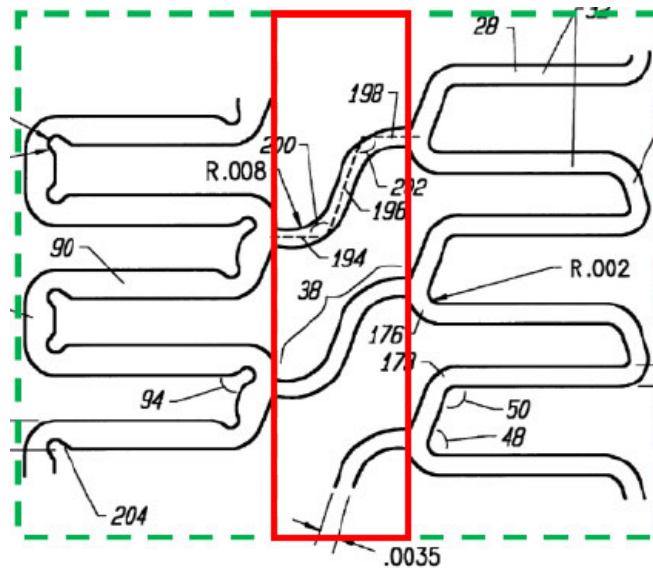


FIG. 9D

'021 Patent fig. 9D (annotated). Inside the dotted boxes are expansion columns made up of a plurality of pairs of expansion struts. The solid box outlines a connecting strut column made up of connecting struts. Each connecting strut has: (i) a section at the “proximal” end that connects to an expansion strut pair in one expansion column; (ii) a section at the “distal” end that connects to an expansion strut pair in another expansion column; and (iii) an intermediate section that is not parallel to the two end sections. *See, e.g., id.* col. 13 ll. 5–18, 38–48. Given

the connecting strut's proximal and distal connections, each connecting strut links expansion strut pairs from two expansion columns in a "peak-to-peak" configuration. The connecting struts are designed to increase the longitudinal flexibility of the stent. *See id.* col. 6 ll. 29–36; *id.* col. 8 ll. 45–47.

Independent claim 1 is representative of the asserted claims:

1. A stent in a non-expanded state, comprising:

a first expansion strut pair including a first expansion strut positioned adjacent to a second expansion strut and a joining strut of the first expansion strut pair that couples the first and second expansion struts at a distal end of the first expansion strut pair, *a plurality of the first expansion strut pair forming a first expansion column;*

a second expansion strut pair including a first expansion strut positioned adjacent to a second expansion strut and a joining strut of the second expansion strut pair that couples the first and second expansion struts of the second expansion strut pair at a proximal end of the second expansion strut pair, *a plurality of the second expansion strut pair forming a second expansion column;*

a first connecting strut including a first connecting strut proximal section, a first connecting strut distal section and a first connecting strut intermediate section, the first connecting strut proximal section being coupled to the distal end of the first expansion strut pair in the first expansion column and the first connecting strut distal section being coupled to the proximal end of the second expansion strut pair of the second expansion column, *a plurality of the first connecting strut forming a first connecting strut column that cou-*

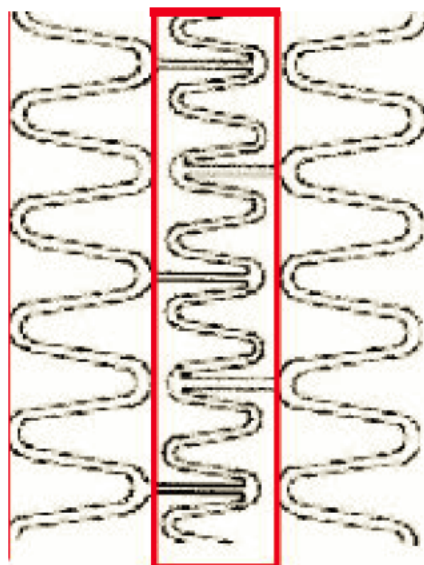
ples the first expansion column to the second expansion column, the first connecting strut intermediate section being nonparallel to the first connecting strut proximal and distal sections, wherein the first expansion strut of the first expansion strut pair in the first expansion column has a longitudinal axis offset from a longitudinal axis of the first expansion strut of the second expansion strut pair in the second expansion column.

Id. col. 18 ll. 9–40 (emphases added).¹

B. BSC’s Express Stent

The Express stent comprises two types of alternating columns or “elements”—referred to as “macroelements” and “microelements”—that are joined together. Microelements, depicted inside the box in the schematic below, are smaller and narrower than the macroelements on either side of the microelements. The microelements include horizontal bars that join the microelements and the macroelements together in a “peak-to-valley” configuration.

¹ As our previous opinion recognized, the PTO cancelled asserted claims 1 and 8 on February 11, 2014 in a second ex parte reexamination. *Jang v. Boston Sci. Corp.*, 767 F.3d 1334 (Fed. Cir. 2014). Because we affirm the district court’s non-infringement determination, and therefore need not address BSC’s cross appeal, the PTO’s cancellation of claims 1 and 8 has no bearing in our decision.



C. Litigation History

In 2002, Dr. Jang executed an agreement assigning the '021 Patent (and another related patent) to BSC, and in return, BSC agreed to pay Dr. Jang about \$50 million. Pursuant to the agreement, under certain conditions, Dr. Jang was entitled to certain royalty payments (up to about \$110 million), if BSC ever developed and sold a coronary stent that was covered by, i.e., would infringe,² Jang's patented technology.

In May 2005, Dr. Jang commenced this case against BSC, asserting that BSC's Express stent was one such stent and consequently BSC owed royalties associated with the sales of the Express stent that BSC had already made. Many years after Dr. Jang filed suit, in October

² We are mindful that this is not a typical patent case where, for example, the plaintiff patentee is asserting a patent against a defendant accused infringer. For convenience, however, we will use "infringe," and the like, when discussing whether the Express stent is covered by the '021 Patent.

2013, BSC requested an ex parte reexamination of the asserted claims before the PTO.

In conjunction with its reexamination request, BSC sought leave to amend its answer to include invalidity defenses, under the theory that the assignment agreement should be interpreted so as to relieve BSC of any obligation to pay royalties for already-made sales of its Express stent, if the asserted claims were determined to be invalid or unpatentable. *See* J.A. at 6091. The district court denied BSC leave to amend, deeming any invalidity defenses “irrelevant” as to whether BSC owed Dr. Jang royalties for past sales under the terms of the assignment agreement. *Id.* The district court reasoned that BSC’s interpretation of the assignment agreement “would lead to an absurd result, namely, that BSC could avoid payment . . . under the [a]greement, even if the [’021 Patent] [were] declared invalid years after the [royalty] payments were due.” *Id.*

BSC then moved for summary judgment using the same tack after the PTO cancelled the asserted claims as unpatentable in the ex parte reexamination. *See id.* at 50–56. BSC contended that it owed Dr. Jang no royalties under the assignment agreement even if they had accrued well before the cancellation because unpatentable claims cannot be infringed. *See id.* at 50. The district court denied summary judgment, holding that BSC still owed royalties to Dr. Jang for any past sales of stents covered by the asserted claims under the assignment agreement, despite the PTO’s subsequent cancellation of those claims. *See id.* at 50–56.

The parties then proceeded to trial as to whether the Express stent infringed the asserted claims of the ’021 Patent. Before trial, BSC moved in limine to preclude Dr. Jang from presenting a doctrine of equivalents theory to the jury, accusing him of merely rehashing his literal infringement theory in the guise of a doctrine of equiva-

lents theory, and thus, failing to provide particularized testimony as to how the Express stent is insubstantially different than the asserted claims. *See id.* at 66–69. The district court denied the motion, finding that Dr. Jang’s experts, Michael J. Lee and Nicolas A.F. Chronos, M.D., sufficiently explained his doctrine of equivalents theory in their expert reports. *See id.* at 68–69.

Collateral to this motion in limine was BSC’s invocation of an ensnarement defense. *See id.* at 9–12. BSC insisted that Dr. Jang’s doctrine of equivalents theory would ensnare the prior art, referencing three prior art patents. *See id.* at 11. The district court decided to conduct a post-trial ensnarement hearing, if the jury returned a verdict of infringement under the doctrine of equivalents. *See id.* at 12207.

The jury ultimately found no literal infringement, but found infringement under the doctrine of equivalents. Following through on its earlier decision, the district court conducted an evidentiary hearing on ensnarement. Dr. Jang objected, asserting that BSC belatedly raised ensnarement, and thus waived it. *See id.* at 9–12; *see also id.* at 34. The district court found no waiver. *See id.* at 9–12.

On the merits of the ensnarement inquiry, Dr. Jang elected to use a hypothetical claim analysis to establish a range of equivalents to which he believed he was entitled, above and beyond the actual scope of his asserted claims. *See id.* at 12–19. In other words, he attempted to construct a hypothetical claim—predicated on representative claim 1—that would be broad enough to literally cover BSC’s Express stent, yet not so broad that it would be unpatentable over the prior art. *See, e.g., Intendis GmbH v. Glenmark Pharm. Inc., USA*, 822 F.3d 1355, 1363–64 (Fed. Cir. 2016). In the course of trying to draft such a hypothetical claim, Dr. Jang constructed approximately ten different claims, and ultimately chose to assert two of

them: hypothetical claim three and hypothetical claim five. *See* J.A. at 14–19. The district court concluded, however, that Dr. Jang failed, as a threshold matter, to draft a proper hypothetical claim for the ensnarement analysis. *See id.* The district court rejected hypothetical claim three because it impermissibly narrowed claim 1 and hypothetical claim five because it failed to broaden claim 1 at all. *See id.* Because Dr. Jang did not meet his burden of persuasion, which includes providing a proper hypothetical claim that does not ensnare the prior art, the district court vacated the jury verdict of infringement under the doctrine of equivalents and entered judgment of non-infringement in favor of BSC. *See id.* at 18–19.

Dr. Jang then moved for JMOL with respect to, *inter alia*, literal infringement. *See id.* at 23–32. The district court found substantial evidence to support the jury’s verdict of no literal infringement, concluding that the jury could have reasonably found either that the Express stent’s microelements corresponded to the claimed expansion columns rather than the claimed connecting strut columns or that the Express stent’s macroelement (first expansion column) was connected to the microelement (second expansion column) in a “peak-to-valley” configuration instead of a “peak-to-peak” configuration. *See id.* at 27. Dr. Jang also moved for a new trial, asserting several bases, all of which the district court rejected. *See id.* at 33–35.

Dr. Jang appeals the district court’s denial of his JMOL for literal infringement, as well as his motion for a new trial, and its vacatur of the jury verdict of infringement under the doctrine of equivalents. BSC purports to cross-appeal the district court’s denial of its summary judgment motion. We have jurisdiction over Dr. Jang’s appeal pursuant to 28 U.S.C. § 1295 (a)(1) (2012).

DISCUSSION

A. Literal Infringement

The parties do not dispute that the Express stent's macroelements literally meet all expansion column-related limitations of claim 1, leaving them to contest only whether the jury had a reasonable basis to find that the Express stent's microelements do not meet all connecting strut-related limitations in the claim. Dr. Jang maintains that a reasonable jury could not have found no literal infringement in this limited context because the undisputed facts showed otherwise and BSC's non-infringement arguments were legally erroneous. At the very least, according to Dr. Jang, he is entitled to a new trial that is not tainted with the legally erroneous arguments. We disagree with Dr. Jang's arguments.

Denials of motions for JMOL or a new trial are reviewed according to the law of the regional circuit—here, the Ninth Circuit. *See, e.g., TVIIM, LLC v. McAfee, Inc.*, 851 F.3d 1356, 1362 (Fed. Cir. 2017). A district court's denial of a motion for JMOL is reviewed de novo. *See, e.g., id.* (citing *Harper v. City of Los Angeles*, 533 F.3d 1010, 1021 (9th Cir. 2008)). A grant of a motion for JMOL is proper only when “the evidence, construed in the light most favorable to the nonmoving party, permits only one reasonable conclusion, and that conclusion is contrary to that of the jury.” *White v. Ford Motor Co.*, 312 F.3d 998, 1010 (9th Cir. 2002) (quoting *Forrett v. Richardson*, 112 F.3d 416, 419 (9th Cir. 1997)). That is, the district court must uphold a jury's verdict “if it is supported by substantial evidence, which is evidence adequate to support the jury's conclusion, even if it is also possible to draw a contrary conclusion.” *Harper*, 533 F.3d at 1021 (quoting *Pavao v. Pagay*, 307 F.3d 915, 918 (9th Cir. 2002)). Substantial evidence is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Theme Promotions, Inc. v. News Am. Mktg.*

FSI, 546 F.3d 991, 1000 (9th Cir. 2008) (quoting *Syufy Enters. v. Am. Multicinema, Inc.*, 793 F.2d 990, 992 (9th Cir. 1986)).

The Ninth Circuit reviews the denial of a motion for a new trial for abuse of discretion. *Incalza v. Fendi N. Am., Inc.*, 479 F.3d 1005, 1013 (9th Cir. 2007). It reverses the denial only if the record lacks any evidence supporting the verdict or if the district court made a mistake of law. *Molski v. M.J. Cable, Inc.*, 481 F.3d 724, 729 (9th Cir. 2007).

Dr. Jang contends that the district court erred in denying his motion for JMOL because it failed to consider whether Dr. Jang proved that the Express stent's microelements were connecting strut columns, notwithstanding the fact that they may also be expansion columns. In other words, that there was sufficient evidence for the jury to find that the Express stent's microelements were expansion columns is irrelevant to the resolution of his motion for JMOL, Dr. Jang argues, so long as he showed that the microelements were connecting strut columns. *See* Appellant Br. at 55 ("If the [microelements] satisfy the claim terms of a connecting-strut column, then they *are* connecting-strut columns for literal infringement purposes, regardless of whether they might *also* be considered something else (such as expansion columns)."). Dr. Jang also maintains that the district court erred in denying his motion for JMOL because BSC's arguments rest on legally erroneous premises and so they cannot support the jury's verdict of no literal infringement.

The issue of literal infringement was a question of fact for the jury. The jury heard Dr. Jang's theory of infringement and his supporting evidence but nevertheless found that the Express stent did not literally infringe. The district court did not fail to consider Dr. Jang's theory of infringement and it correctly found substantial evidence to support the jury's finding that the Express

stent's microelements do not literally meet the connecting-strut-column-related limitations in claim 1. *See* J.A. at 25–28. BSC's expert, James Moore, Ph.D., testified that the Express stent's macroelements *and* the microelements were more akin to the claimed expansion columns than the claimed connecting strut columns in the asserted claims because both elements expand the Express stent when needed, which causes foreshortening of the stent. *See id.* at 9330–43, 9389–90. These elements stood in contrast to the claimed connecting strut columns that do not expand when the claimed stent expands, and instead, compensate for the foreshortening caused by the expansion of the claimed expansion columns. *See id.* Moreover, the Express stent's macroelements and microelements are joined together in a “peak-to-valley” configuration by a connecting strut with a parallel intermediate section, i.e., a straight, horizontal connector—as opposed to the claimed expansion columns that are joined in a “peak-to-peak” configuration by a connector with a non-parallel intermediate section.³ *See id.* Dr. Jang's experts conceded as much. *See id.* at 8877–79 (Mr. Lee acknowledging that the Express stent's microelements could be expansion columns); *id.* at 8869–73 (Mr. Lee recognizing that the Express stent's microelements and macroelements could be viewed as being joined by straight connectors); *id.* at 9260–61 (Dr. Chronos acknowledging that the Express stent's microelements behave like expansion columns); *id.* at 9284–85 (Dr. Chronos recognizing that if the Express stent's microelements and macroelements are viewed as expansion columns, then they are joined by a straight connector). The jury's verdict of no literal infringement, therefore, is supported by substantial evidence.

³ Despite the fact that the asserted claims do not use the term “peak-to-peak,” the parties agree that this is an inherent limitation of the asserted claims.

Dr. Jang failed to persuade the district court that BSC's non-infringement arguments were legally erroneous. We are similarly unpersuaded. Dr. Jang characterizes BSC's position as one of mutual exclusivity and argues that this purported "either/or" position effectively imported a negative limitation into the definition of 'connecting strut column.'" Appellant Reply Br. at 33. Dr. Jang misrepresents BSC's non-infringement arguments. BSC did not argue, as Dr. Jang contends, that microelements could only be deemed either exclusively expansion columns or exclusively connecting strut columns. Rather, BSC fairly argued at trial that the microelements, like the macroelements, simply are expansion columns. J.A. at 8413–14, 10573. In particular, BSC argued that there was no literal infringement because those two expansion columns are joined by straight connectors in a peak-to-valley configuration. *Id.* at 10570, 11366.

Dr. Jang also contends that BSC misled the jury to find no literal infringement because BSC told the jury that the Express stent's microelements could not be the claimed connecting strut columns due to the presence of "extra metal" in the microelements that is not recited in the asserted claims. This was erroneous according to Dr. Jang because the asserted claims use the transitional phrase "comprising," i.e., open-ended claim language, and so the addition of "extra metal" in the Express stent cannot preclude a finding of literal infringement. But this was not one of BSC's non-infringement positions at trial. To the extent that BSC introduced this "extra metal" concept to the jury, BSC did so, not as an alternative non-infringement position, but as an explanation that Dr. Jang's experts ignored certain structural features of the Express stent in their infringement analyses, thereby undermining the strength of their testimony on whether the microelements were connecting strut columns. *See id.* at 9343, 10579–80.

In sum, a reasonable jury could have returned a verdict of no literal infringement based on the evidence presented at trial. We consequently have no basis to order a new trial.

B. Ensnarement in View of a Hypothetical Claim

In an appeal relating to the doctrine of equivalents, a party often challenges the fact finding made below of infringement (or no infringement) under that doctrine, which is usually analyzed under the well-established “substantially the same function-way-result” or “insubstantial differences” inquiry. Here, however, the jury’s finding that the Express stent satisfies each claim element of the asserted claims under the doctrine of equivalents is not on appeal. Instead, this appeal centers on the district court’s application of a limitation on the reach of the doctrine, known as “ensnarement.”

Dr. Jang insists that the district court erred in several respects in overturning the jury’s verdict of infringement under the doctrine of equivalents based on BSC’s ensnarement defense. Dr. Jang argues that his hypothetical claims three and five are properly broader in scope than representative claim 1, and if they were flawed, the district court was required to proceed with an ensnarement analysis, even if that meant the district court would have to devise an acceptable hypothetical claim for Dr. Jang that was broader in scope than representative claim 1. Dr. Jang is wrong on both counts.

A doctrine of equivalents theory cannot be asserted if it will encompass or “ensnare” the prior art. *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1322 (Fed. Cir. 2009). “This limitation is imposed even if a jury has found equivalence as to each claim element.” *Id.* at 1323 (citing *Wilson Sporting Goods Co. v. David Geoffrey & Assocs.*, 904 F.2d 677, 683, 687 (Fed. Cir. 1990), *overruled in part on other grounds*, *Cardinal Chem. Co. v. Morton Int’l, Inc.*, 508 U.S. 83, 92 n.12 (1993)). A

“[h]ypothetical claim analysis is a practical method to determine whether an equivalent would impermissibly ensnare the prior art.”⁴ *Intendis*, 822 F.3d at 1363–64 (citing *Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co.*, 204 F.3d 1360, 1364 (Fed. Cir. 2000)). We have explained:

Hypothetical claim analysis is a two-step process. The first step is “to construct a hypothetical claim that literally covers the accused device.” Next, prior art introduced by the accused infringer is assessed to “determine whether the patentee has carried its burden of persuading the court that the hypothetical claim is patentable over the prior art.” In short, [the court] ask[s] if a hypothetical claim can be crafted, which contains both the literal claim scope and the accused device, without ensnaring the prior art.

Id. at 1363 (quoting *DePuy*, 567 F.3d at 1324, 1325); see also *Ultra-Tex Surfaces*, 204 F.3d at 1364–65 (“Under a hypothetical claim analysis, a patentee proposes a hypothetical claim that is sufficiently broad in scope to *literally* encompass the accused product or process. If that claim would have been allowed by the PTO over the prior art, then the prior art does not bar the application of the doctrine of equivalents.” (citations omitted)). “The burden of producing evidence of prior art to challenge a hypothetical claim rests with an accused infringer, but the burden

⁴ The hypothetical claim analysis is not the only method in which a district court can assess whether a doctrine of equivalents theory ensnares the prior art. See *Conroy v. Reebok Int’l, Ltd.*, 14 F.3d 1570, 1576–77 (Fed. Cir. 1994); *Int’l Visual Corp. v. Crown Metal Mfg. Co.*, 991 F.2d 768, 772 (Fed. Cir. 1993). We note that Dr. Jang never asked the district court to assess the scope of his doctrine of equivalents theory using a method other than the hypothetical claim analysis.

of proving patentability of the hypothetical claim rests with the patentee.”⁵ *Interactive Pictures Corp. v. Infinite Pictures, Inc.*, 274 F.3d 1371, 1380 (Fed. Cir. 2001) (citing *Streamfeeder, LLC v. Sure-Feed, Inc.*, 175 F.3d 974, 984 (Fed. Cir. 1999)). “We review a district court’s conclusion that a hypothetical claim does not encompass the prior art de novo and resolution of underlying factual issues for clear error.” *Intendis*, 822 F.3d at 1363 (citing *DePuy*, 567 F.3d at 1324).

The district court correctly concluded that Dr. Jang’s hypothetical claims three and five were flawed and properly declined to conduct any hypothetical claim analysis as a result. See J.A. at 12–19. Dr. Jang’s hypothetical claim three reads:

the first connecting strut ~~intermediate section being non-parallel to the first connecting strut proximal and distal sections~~ column configured to provide increased flexibility compared to the first and second expansion columns.

Id. at 14 (strikethrough and emphasis to reflect amendments to claim 1).⁶ Although hypothetical claim three is broader than claim 1 by deleting the non-parallel intermediate section limitation (thereby encompassing connecting struts with a parallel intermediate section), it also

⁵ We have described the ensnarement inquiry as one of determining the *patentability* of the hypothetical claim, rather than its validity. That is because “[t]he pertinent question” is “whether that hypothetical claim could have been allowed by the PTO over the prior art” as the PTO has never actually issued it. *Wilson Sporting Goods*, 904 F.2d at 684.

⁶ We will not recite the other limitations of claim 1 that remain unchanged in Dr. Jang’s hypothetical claims three and five.

is narrower by adding the requirement that the connecting strut column must provide more flexibility as compared to the expansion columns. Our precedent has been clear, however, that a patentee's hypothetical claim may not add any narrowing limitations. *See Streamfeeder*, 175 F.3d at 983 (“While use of a hypothetical claim may permit a minor extension of a claim to cover subject matter that is substantially equivalent to that literally claimed, one cannot, in the course of litigation and outside of the PTO, cut and trim, expanding here, and narrowing there, to arrive at a claim that encompasses an accused device, but avoids the prior art. Slight broadening is permitted at that point, but not narrowing.”). Whereas claim 1 previously covered embodiments where the connecting strut column has the *same or lesser* degree of flexibility when compared to the first and second expansion columns, hypothetical claim three narrows claim 1 so that the connecting strut column must have an *increased* degree of flexibility when compared to the first and second expansion columns. *See J.A.* at 16. The district court thus correctly rejected Dr. Jang's hypothetical claim three.

Dr. Jang contends that the combination of the added comparative flexibility limitation with the deletion of the non-parallel intermediate section limitation results in an overall broader claim scope than claim 1, because, in his view, the comparative flexibility limitation recites the function that the non-parallel intermediate section of the connecting strut is designed to achieve. In other words, Dr. Jang argues that he simply is replacing a structural limitation for a functional limitation that encompasses the structural limitation, as well as all other structures that perform that function. But this argument is problematic because nothing in the '021 Patent or elsewhere in the record indicates that the claimed connecting strut columns provide increased flexibility in comparison to the claimed expansion columns. Although the specification

explains that the connecting strut columns improve a particular form of flexibility (i.e., longitudinal) of the stent as a whole, *see* '021 Patent col. 6 ll. 29–36; *id.* col. 8 ll. 45–47, it never discusses the flexibility of the connecting strut columns vis-à-vis the expansion columns. We thus cannot agree with Dr. Jang that the limitation he added in hypothetical claim three is merely a broader version of the limitation he deleted from claim 1.

As for Dr. Jang's hypothetical claim five, it reads:

a first connecting strut including *at least* a first connecting strut proximal section, a first connecting strut distal section and a first connecting strut intermediate section[.]

J.A. at 17 (emphasis to reflect amendment to claim 1). This hypothetical claim does not broaden claim 1 at all. Claim 1 already uses the transitional phrase “comprising” to establish an open-ended claim. *See, e.g., Vehicular Techs. Corp. v. Titan Wheel Int'l, Inc.*, 212 F.3d 1377, 1383–84 (Fed. Cir. 2000) (“A drafter uses the term ‘comprising’ to mean ‘I claim at least what follows and potentially more.’”). Thus, the addition of “at least” to hypothetical claim five is redundant with claim 1's recitation of “comprising.” In short, hypothetical claim five and claim 1 have the same claim scope.

Following Dr. Jang's troubles in drafting a proper hypothetical claim that encompassed the Express stent yet was also patentable in the face of seemingly crowded prior art (a venture that began with generating approximately ten different hypothetical claims), the district court was under no obligation to undertake a hypothetical claim analysis on his behalf. A patentee, like Dr. Jang, bears the burden of proving that it is entitled to “the range of equivalents which it seeks.” *Wilson Sporting Goods*, 904 F.2d at 685. And, when utilizing the hypothetical claim tool, that burden starts with proposing a proper hypothetical claim that only broadens the issued

asserted claims. *See Streamfeeder*, 175 F.3d at 983. Dr. Jang cannot effectively transfer the responsibility of defining the range of equivalents to which he is entitled to the district court.⁷ *See Ultra-Tex Surfaces*, 204 F.3d at 1364 (“Under a hypothetical claim analysis, *a patentee proposes a hypothetical claim . . .*” (emphasis added)). Because, as a threshold matter, Dr. Jang failed to submit a proper hypothetical claim for consideration, he was unable to meet his burden of proving that his doctrine of equivalents theory did not ensnare the prior art. The district court thus correctly vacated the jury verdict of infringement under the doctrine of equivalents.

Failing on the merits, Dr. Jang turns to several purported procedural infirmities in the district court’s handling of BSC’s ensnarement defense. Dr. Jang specifically argues that BSC waived its ensnarement defense because: (1) BSC failed to raise the defense in a motion for either summary judgment or JMOL; (2) the defense was a proxy for invalidity defenses that were excluded by the district court earlier in the case; (3) BSC’s belated notice to Dr. Jang of the defense was prejudicial because it deprived him of any pre-trial discovery related to the defense; and (4) the defense was never listed in the pretrial order as required by Ninth Circuit law. We address each of these unpersuasive arguments in turn.

⁷ In *Streamfeeder*, after we rejected the patentee’s hypothetical claim for impermissibly narrowing the patent claim in one respect while also broadening it in another, we additionally explained why a proper hypothetical claim in that case—one without the narrowing limitation—was unpatentable over the prior art. *See* 175 F.3d at 983–84. Nothing in *Streamfeeder*, however, requires courts to engage in this additional inquiry when the patentee fails to come forward with a proper hypothetical claim.

First, Dr. Jang argues that in *DePuy* we held that ensnarement must be raised in a motion for either summary judgment or JMOL. See Appellant Br. at 30 (citing *DePuy*, 567 F.3d at 1324). But that is an unduly narrow reading of *DePuy*. We considered in that case whether ensnarement is a factual question that must be tried to the jury. 567 F.3d at 1323. To answer that question, we turned to precedent, which has treated ensnarement and prosecution history estoppel on equal footing. See *id.* (“We have called ensnarement and prosecution history estoppel, collectively, ‘two policy oriented limitations’ on the doctrine of equivalents, both of which are ‘applied as questions of law.’” (quoting *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 870 (Fed. Cir. 1985), *overruled in part on other grounds*, *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 1068 (Fed. Cir. 1998) (en banc))). Because prosecution history estoppel was a legal question for a district court to consider, we concluded that ensnarement was one as well. See *id.* (“We see no reason why ensnarement should be treated differently, for procedural purposes, than prosecution history estoppel.”). We held that

[E]nsnarement, like prosecution history estoppel, is “to be determined by the court, either on a pre-trial motion for partial summary judgment or on a motion for judgment as a matter of law at the close of the evidence and after the jury verdict.” As a practical matter, both legal limitations may be readily addressed in the same set of motions.

Id. at 1324 (quoting *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39 n.8 (1997)). Our “holding” in *DePuy* was not that these two motions were the only vehicles by which to raise ensnarement. Instead, when read in context, *DePuy* is most fairly understood as holding that ensnarement is a legal question for the district court to decide and that the district court *could*, but did not have to, decide that question through particular types

of motions. *See id.* This is especially so because the district court in *DePuy* conducted a separate ensnarement proceeding after a jury verdict of infringement under the doctrine of equivalents, just as the district court did here. *See id.* at 1321–22. We see nothing legally unsound in BSC raising ensnarement through its pretrial motion in limine, and the district court conducting a post-trial hearing on the defense contingent on an infringement verdict under the doctrine of equivalents. Moreover, based on a review of the record, we are satisfied that Dr. Jang received sufficient notice of BSC’s ensnarement argument.

Second, Dr. Jang argues that the district court should have barred BSC from presenting its ensnarement defense as a matter of law because BSC was not allowed to challenge the validity of the asserted claims. Allowing BSC to repackage previously-excluded invalidity defenses in the guise of an ensnarement defense, he argues, is a “camouflaged or back-handed attack” on the validity of the asserted claims and effectively an end run around the right to a jury trial on validity. *See* Appellant Br. at 47, 50 (quoting *Thomas & Betts Corp. v. Litton Sys., Inc.*, 720 F.2d 1572, 1580 (Fed. Cir. 1983)).

We are unpersuaded by Dr. Jang’s attempt to conflate two different concepts. We have explained before that “[t]he ensnarement inquiry . . . has no bearing on the validity of the actual claims” asserted in a case. *DePuy*, 567 F.3d at 1323 (citing *Wilson Sporting Goods*, 904 F.2d at 685). And that is because ensnarement concerns patentability with respect to a hypothetical patent claim as opposed to the validity of an actual patent claim. *See Wilson Sporting Goods*, 904 F.2d at 685 (“Leaving this burden [of proving that the range of equivalents sought does not ensnare the prior art] on [the patentee] does not, of course, in any way undermine the presumed validity of [its] actual patent claims. In the present situation, [the patentee’s] claims will remain valid whether or not [it]

persuades us that it is entitled to the range of equivalents sought here.”). Thus, the fact that BSC could not pursue a validity challenge of the asserted claims in this litigation does not somehow mandate that it is likewise barred from challenging a necessarily-broader set of newly-minted, hypothetical claims.

Dr. Jang’s reliance on *Thomas & Betts* is misplaced. There, we stated that “[w]here [the] validity [of a patent] in view of the prior art has not been challenged, the [district] court is less free to limit the application of the doctrine of equivalents than where invalidity is specifically urged” 720 F.2d at 1580. That observation about the relative application of the doctrine of equivalents in two different factual scenarios, however, is not a license for a patentee to obtain a range of equivalents that ensnares the prior art, even if an alleged infringer does not challenge the validity of the underlying patent claims. See *Wilson Sporting Goods*, 904 F.2d at 684.

Third, Dr. Jang was not prejudiced by any lack of pre-trial discovery as to ensnarement. The district court ruled that Dr. Jang could proceed with a doctrine of equivalents theory at trial only shortly before it started. See J.A. at 68–69. It also alerted the parties during this time frame that it would conduct an ensnarement hearing if the jury returned a verdict of infringement under the doctrine of equivalents. *Id.* at 12207 (post-verdict Minute Order: “After directing the [c]lerk to enter the jury’s verdict into the record, the [district court] reminded counsel for both parties of *its prior ruling that in the event the jury found in favor of [p]laintiff under the doctrine of equivalents theory*, it would proceed with an evidentiary hearing on the issue of ensnarement.” (emphasis added)). By then there was little to no time to reopen discovery, let alone a motion by Dr. Jang to do so, which could have resulted in a waste of the party’s resources and disrupted the district court’s case management, had the jury not returned a verdict of infringement under the

doctrine of equivalents. In between the jury's verdict and the ensnarement hearing, the parties had "three weeks to develop evidence, expert opinion, and argument . . . [on the ensnarement] defense." Appellant Br. at 34. Each party was presumably on a level playing field when they arrived at the hearing. If Dr. Jang deemed otherwise, he could have moved the district court for an enlargement of time to conduct additional discovery on the defense.

Fourth and finally, Dr. Jang argues that "Ninth Circuit law is clear that any defense not listed in the [p]retrial [o]rder is waived," and that because ensnarement was not listed in the pretrial order, the defense was waived. Appellant Br. at 31–32 (citing *Pierce Cty. Hotel Emps. & Rest. Emps. Health Tr. v. Elks Lodge*, 827 F.2d 1324, 1329 (9th Cir. 1987); *United States v. First Nat'l Bank of Circle*, 652 F.2d 882, 886 (9th Cir. 1981)). But this puts the cart before the horse. Dr. Jang has not adequately articulated why proper preservation of ensnarement required its explicit mention in the pretrial order. The pretrial order governs trial, *see, e.g.*, Fed. R. Civ. P. 16(e), but ensnarement is a legal question for the district court to decide, and the district court here notified the parties before trial that it would resolve that question, if necessary, outside of the trial, *see* J.A. at 12207. We see no reason why the district court should have mentioned ensnarement or the contingent post-trial hearing on ensnarement in the pretrial order under these circumstances.

In sum, the district court permissibly conducted a post-trial ensnarement hearing after finding that BSC timely raised the defense, and it appropriately vacated the jury verdict of infringement under the doctrine of equivalents and entered judgment of non-infringement for BSC when Dr. Jang failed to demonstrate through a proper hypothetical claim analysis that his doctrine of equivalents theory did not ensnare the prior art.

C. Cross-Appeal

BSC cross-appeals the denial of its motion for summary judgment, in which the district court held that it owed royalties to Dr. Jang, if the Express stent were covered by the asserted claims, notwithstanding the PTO's eventual cancellation of those claims. We dismiss the cross-appeal because it does not seek to enlarge the district court's judgment of non-infringement in its favor. Instead, the cross-appeal merely offers an alternative basis to affirm the judgment. See *Howmedica Osteonics Corp. v. Wright Med. Tech., Inc.*, 540 F.3d 1337, 1343 n.2 (Fed. Cir. 2008) (dismissing "cross-appeal as improper because it did not seek to enlarge the judgment but merely asserted an alternative ground to affirm the judgment"); see also *Symantec Corp. v. Computer Assocs. Int'l, Inc.*, 522 F.3d 1279, 1294–95 (Fed. Cir. 2008). When an improper cross-appeal is dismissed, we may nonetheless consider the arguments raised as alternative grounds for sustaining the judgment. *Symantec*, 522 F.3d at 1294. Because we affirm the district court's judgment on other grounds, we need not do so here.

CONCLUSION

Based on the foregoing analyses, the district court correctly denied Dr. Jang's motion for JMOL of literal infringement of claims 1 and 8 of the '021 Patent as substantial evidence supported the jury's verdict of no literal infringement. The district court properly vacated the jury's finding of infringement under the doctrine of equivalents because it correctly concluded that Dr. Jang did not meet his burden of proving that his doctrine of equivalents theory did not ensnare the prior art as he failed to draft a proper hypothetical claim. The district court consequently entered judgment of non-infringement in favor of BSC, and we *affirm* that entry of judgment. We *dismiss* the cross-appeal and need not reach the arguments it raised.

AFFIRMED.

COSTS

No costs.