

United States Court of Appeals  
for the Federal Circuit

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TRIVASCULAR, INC.,  
*Appellant*

v.

SHAUN L. W. SAMUELS,  
*Appellee*

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2015-1631

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Appeal from the United States Patent and Trademark  
Office, Patent Trial and Appeal Board in No. IPR2013-  
00493.

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Decided: February 5, 2016

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DAVID K.S. CORNWELL, Sterne Kessler Goldstein &  
Fox, PLLC, Washington, DC, argued for appellant. Also  
represented by PAULINE PELLETIER, RICHARD D. COLLER,  
III.

JAMES D. PETRUZZI, Petruzzi Law Firm, Houston, TX,  
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DIEDERIKS, JR., NICHOLAS SPENCER WHITELAW, Diederiks  
& Whitelaw PC, Woodbridge, VA.

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Before MOORE, O'MALLEY, and WALLACH, *Circuit Judges*.

O'MALLEY, *Circuit Judge*.

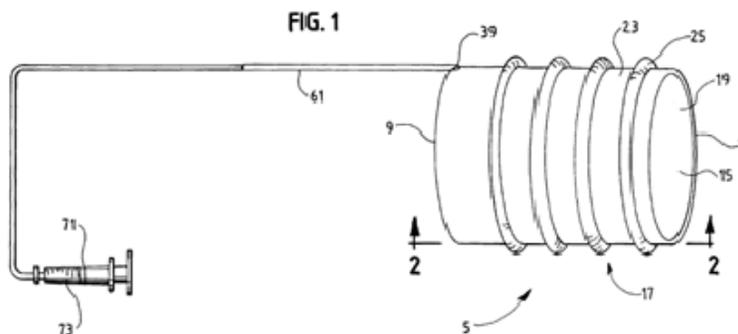
TriVascular, Inc. (“TriVascular”) appeals the judgment of the Patent Trial and Appeal Board (“the Board”) holding that TriVascular failed to satisfy its burden of proving that the challenged claims of U.S. Patent No. 6,007,575 (“the ’575 patent”) are invalid as obvious. For the reasons below, we affirm.

#### BACKGROUND

The ’575 patent claims inventions in the field of intraluminal stent technology. One type of intraluminal stent is a vascular stent. Vascular stents are used to treat medical conditions wherein a vascular wall is unduly constricted, as in the case of vascular stenosis, or unduly enlarged, as in the case of aneurysm. Either of these medical conditions poses an unacceptable risk of insufficient blood flow or vascular rupture.

#### The Patent in Suit

The ’575 patent was filed on June 6, 1997, and lists a sole inventor, Dr. Shaun L.W. Samuels. The ’575 patent generally claims intraluminal stents that can be affixed to a vascular wall via the use of “an inflatable and deflatable cuff” without penetrating the vessel wall. ’575 patent, col. 6 ll. 47-67. These “inflatable and deflatable cuffs” are depicted by the number 17 in Figure 1 of the ’575 patent below, and can be inflated by introduction of a fluid into each of the “circumferential ridges” 25.



*Id.* at fig. 1.

Claim 1 of the '575 patent is illustrative and recites:

1. An inflatable intraluminal stent adapted to be secured to the interior of a tubular structure within the human body comprising:

a) an inflatable and deflatable cuff of generally hollow cylindrical continuation having a collapsible lumen, an inner surface, an inlet, an outlet and a friction enhancing outer surface, *said friction-enhancing outer surface featuring inflatable protrusion(s) including at least one circumferential ridge disposed about the inflatable cuff*, said friction-enhancing outer surface engaging the interior of the tubular structure without penetration to prevent the cuff from moving in a longitudinal direction with respect to the tubular structure when said cuff is in a fully inflated condition;

b) means for injecting an inflation material into said cuff to inflate it; and

c) a valve integral with the inflatable cuff for permitting entry of the inflation material from the means for injecting and thereafter sealing said cuff to prevent deflation.

*Id.* at col. 6 ll. 47-67 (emphasis added). TriVascular disputes the Board's construction of the claim term "circumferential ridge," which appears in part (a) of the claim.

#### Procedural Background

In 2013, Dr. Samuels sued TriVascular alleging infringement of the '575 patent. *Samuels v. TriVascular Corp.*, Case No. 3:13-cv-02261 (N.D. Cal. May 17, 2013). TriVascular filed a petition for *inter partes* review ("IPR") on August 5, 2013. The Board instituted review on February 4, 2014. Joint Appendix ("JA") 168. In its Institu-

tion Decision, the Board explained that it was instituting IPR on the following two grounds: (1) obviousness over Samuel's U.S. Patent No. 5,423,851 ("Samuels '851") and U.S. Patent No. 5,423,745 to Todd *et al.* ("Todd"); and (2) obviousness over U.S. Patent No. 5,693,088 to Lazarus *et al.* ("Lazarus") and Todd. JA 184. In its Institution Decision, the Board construed the phrase "circumferential ridge disposed about the inflatable cuff" to mean "raised strip disposed circumferentially about the outer surface of the inflatable cuff." JA 175-76. Applying its claim construction, the Board then found that "on the present record," Samuels had not demonstrated that the Samuels '851 reference teaches away from the substitution of the penetrating anchoring barbs taught in the reference, nor did Samuels establish that removing the barbs would destroy the objective of the reference. JA 183. Accordingly, the Board explained that TriVascular had established a reasonable likelihood of success on two potential grounds.

The parties subsequently introduced their respective expert reports regarding the instituted grounds. The IPR proceeded to trial, and the Board issued a final decision on December 13, 2014, holding that TriVascular failed to meet its burden of demonstrating that the challenged claims were unpatentable over the applied art. JA 24. In its Final Written Decision, the Board adopted Samuels' construction of "inflatable protrusions," as "protrusions that are themselves inflatable, i.e., expandable by being filled with fluid." JA 10. The Board found that, *inter alia*, the '575 patent's "inflatable protrusions" were not disclosed by the prior art, nor would a skilled artisan have been motivated to combine the prior art in a manner that would read on the claims of the '575 patent. The Board also found that the prior art did not teach the "circumferential ridges" taught in the '575 patent at issue, based on its claim construction at institution, which did not permit the "circumferential ridges" to be made up of a series of

*discontinuous* inflatable protrusions formed circumferentially about the cuff. JA 18-19.

After issuance of the Final Written Decision, TriVascular filed a petition for rehearing, which the Board denied. JA 34.

TriVascular timely appealed. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

#### DISCUSSION

TriVascular argues that the Board erred in its construction of the term “circumferential ridges,” and in its holding that TriVascular failed to demonstrate that the challenged claims of the ’575 patent are invalid as obvious. Because we find no reversible error in the Board’s holdings, we affirm.

##### A. Standard of Review

When reviewing claim construction by the Board, “[w]e review underlying factual determinations concerning extrinsic evidence for substantial evidence and the ultimate construction of the claim *de novo*.” *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1280 (Fed. Cir. 2015), *cert. granted sub nom., Cuozzo Speed Techs., LLC v. Lee*, No. 15-446, 2016 WL 205946 (U.S. January 15, 2015).

Obviousness is a question of law based on underlying facts. *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). The Board’s legal conclusion of obviousness is reviewed *de novo*; its factual findings concerning extrinsic evidence are reviewed for substantial evidence. *Cuozzo*, 793 F.3d at 1280.

Substantial evidence “means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938); *see In re Morsa*, 713 F.3d 104, 109 (Fed. Cir. 2002).

## B. Claim Construction

TriVascular argues that the Board erred in its claim construction requiring the term “circumferential ridges” to mean a “raised strip disposed circumferentially about the outer surface of the inflatable cuff.” Instead, TriVascular contends that the Board should have construed the term to mean “an elevated part of the outer surface disposed about the inflatable cuff that can be *either continuous or discontinuous*.” Appellant’s Br. 3 (emphasis added). TriVascular argues that the Board’s construction is inconsistent with the plain meaning of the term “circumferential ridges.” TriVascular further contends that the Board erred in failing to apply prosecution history disclaimer to bar Samuels from arguing for a narrower construction.

Samuels responds that the Board correctly interpreted “circumferential ridges” because the plain language and specification support the construction of continuous raised ridges disposed radially around the inflatable cuff. Samuels further asserts that the Board did not err in rejecting TriVascular’s interpretation of the prosecution history in construing the term. For the reasons below, we agree with Samuels.

### 1. Broadest Reasonable Interpretation Standard

In construing claim terms, the Board must determine the scope of the claims by giving them their broadest reasonable construction in light of the specification as they would be interpreted by one of ordinary skill in the art. *Cuozzo*, 793 F.3d at 1279-80; *compare Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc). Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history. *Straight Path IP Grp., Inc. v. Sipnet EU S.R.O.*, 806 F.3d 1356, 1362 (Fed. Cir. 2015).

While the broadest reasonable interpretation standard is broad, it does not give the Board an unfettered license to interpret the words in a claim without regard for the full claim language and the written description. *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1260 (Fed. Cir. 2010); see *In re Abbott Diabetes Care, Inc.*, 696 F.3d 1142, 1148-50 (Fed. Cir. 2012) (finding the Patent Office’s construction unreasonably broad because it was “unreasonable and inconsistent with the language of the claims and the specification”). Construing individual words of a claim without considering the context in which those words appear is simply not “reasonable.” Instead, it is the “use of the words in the context of the written description and customarily by those of skill in the relevant art that accurately reflects both the ‘ordinary’ and ‘customary’ meaning of the terms in the claims.” *Ferguson Beauregard/Logic Controls, Div. of Dover Res., Inc. v. Mega Sys., LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003).

## 2. The Board’s Claim Construction

The Board determined that the plain meaning of “circumferential ridges” under the broadest reasonable interpretation standard does not encompass *discontinuous* points arranged in a circular pattern on the surface of a stent. The Board found support for its construction in the written description, noting that it described a circumferential ridge as a raised strip “disposed about [the] circumference of outer surface **23** of inflatable cuff **17**.” JA 175-76 (citing ’575 patent, fig. 1). The Board also relied on a general purpose dictionary, finding the definition of “ridge” as “a raised strip (as of plowed ground)” to be in accord with the specification’s description of a raised strip. JA 176. Finally, the Board found that TriVascular’s proposed construction of “circumferential” that would encompass *discontinuous* raised sections “does not inform the meaning of the term ‘circumferential ridge.’” JA 30.

TriVascular alleges that the Board's construction is contrary to the plain meaning of the claim term. In support of its argument, TriVascular asserts that the Board's construction is unreasonably narrow in light of the common definition of a topological "ridge." TriVascular points to the Blue Ridge Mountains in the Appalachian Mountain Range, which TriVascular alleges constitute "discontinuous" protrusions that collectively form the mountain ridge. Appellant's Br. 31-32. We find TriVascular's arguments to be unpersuasive. First, we note that TriVascular does not explain why the Board should have resorted to a topological or cartographical definition of "ridge," over a general dictionary definition that is consistent with both the specification's teachings and the remaining claim limitations. And, even resorting to the topological definition of ridge, TriVascular has failed to explain why such a topological definition would encompass *discontinuous* peaks in a mountain range, when mountain ranges typically consist of adjacent, continuous mountain peaks.<sup>1</sup> To adopt TriVascular's definition and construe "circumferential" to include discontinuous points would be to adopt an unreasonably broad construction.

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<sup>1</sup> TriVascular's utilization of the Blue Ridge Mountains as an exemplary mountain ridge is particularly unresponsive of their position. In fact, the National Park Service has noted that the Blue Ridge Mountains were so named because "hydrocarbons released into the atmosphere by the forest contribute to the characteristic haze on these mountains and to their distinctive color." National Park Service, Blue Ridge Mountains, Frequently Asked Questions, at <http://www.nps.gov/blri/faqs.htm> (last visited January 8, 2016). The eponymous blue haze of the mountain range constitutes a *continuous* ridge bridging the range's mountain peaks. Thus the word "Blue" modifies the term "Ridge"; the term "Ridge" is not intended to modify the word "Mountains."

*See Microsoft Corp. v. Proxycorr, Inc.*, 789 F.3d 1292, 1300 (Fed. Cir. 2015) (finding that the Board’s construction of key claim terms was unreasonably broad in light of the broadest reasonable interpretation standard, and on that basis vacating and remanding the Board’s finding of unpatentability). We find the Board’s reliance on the dictionary definition of ridge when considered in the context of the written description and plain language of the claims was proper.<sup>2</sup>

### 3. Prosecution History Disclaimer

TriVascular’s other alleged basis of error was that the Board should have applied prosecution history disclaimer to prohibit a construction of “circumferential ridges” that is limited to continuous ridges. Appellant’s Br. 33.

The same general tenets that apply to prosecution history estoppel apply to prosecution history disclaimer. *Regents of Univ. of Minnesota v. AGA Med. Corp.*, 717 F.3d 929, 942 (Fed. Cir. 2013) (drawing a parallel between prosecution history estoppel barring an equivalence argument under the doctrine of equivalents and prosecution history disclaimer barring a position on claim construction under § 112, ¶ 6 that is inconsistent with one taken before the PTO, and noting that “prosecution histo-

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<sup>2</sup> Because TriVascular argues for a broader construction than the one the Board employed rather than a narrower one, the Supreme Court’s grant of certiorari to consider the propriety of the broadest reasonable interpretation standard in IPRs will not impact our decision to affirm the Board’s claim construction and non-obviousness conclusion here. *Cuozzo*, 793 F.3d 1268, *cert. granted*, *Cuozzo Speed Techs., LLC v. Lee*, No. 15-446, 2016 WL 205946 (U.S. Jan. 15, 2016). Accordingly, we need not delay deciding this case pending the Supreme Court decision in *Cuozzo*.

ry disclaimer may limit the range of equivalent structures that fall within the scope of a means-plus-function limitation.”). Both doctrines require that the claims of a patent be interpreted in light of the proceedings in the PTO during the application process. *See Festo Corp. v. Sho-ketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 733 (2002). As applied to a disclaimer analysis, “the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention.” *Phillips*, 415 F.3d at 1317. “Any explanation, elaboration, or qualification presented by the inventor during patent examination is relevant, for the role of claim construction is to ‘capture the scope of the actual invention’ that is disclosed, described, and patented.” *Fenner Invs., Ltd. v. Cellco P’ship*, 778 F.3d 1320, 1323 (Fed. Cir. 2015) (citing *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1305 (Fed. Cir. 2011)). Accordingly, disclaimer “ensures that claims are interpreted by reference to those ‘that have been cancelled or rejected.’” *Festo Corp.*, 535 U.S. at 733 (citing *Schriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211, 220 (1940)). The party seeking to invoke prosecution history disclaimer bears the burden of proving the existence of a “clear and unmistakable” disclaimer that would have been evident to one skilled in the art. *See Elbex Video, Ltd. v. Sensormatic Elecs. Corp.*, 508 F.3d 1366, 1371 (Fed. Cir. 2007).

TriVascular’s argument on prosecution history disclaimer proceeds in several steps. First, TriVascular notes that the examiner initially rejected the claims at issue by interpreting Samuels ’851 as having “inflatable protrusions” that form a “circumferential ridge.” Appellant’s Br. 34. Second, TriVascular observes that Samuels responded to this rejection by (a) stating that Samuels ’851 did not disclose “continuous” circumferential ridges and (b) introducing an “Amendment B” adding the word “continuously” to the claim phrase “at least one circum-

ferential ridge *continuously* disposed about said inflatable cuff.” JA 707. Third and finally, TriVascular notes that Samuels did not expressly include the term “continuous” in the final issued claims. TriVascular argues that this series of events triggers prosecution history disclaimer that bars Samuels from now arguing for a construction limited to “continuous” circumferential ridges, which was not claimed in the final issued claims. Appellant’s Br. 34.

The Board rejected TriVascular’s prosecution history disclaimer argument, explaining in relevant part as follows:

TriVascular’s arguments focus on the patent applicant’s “Amendment B” in isolation, and are unpersuasive in view of the subsequent prosecution history, which shows that the positions of the Examiner and the patent applicant changed following a telephone interview. . . . Ultimately, an Examiner’s Amendment was entered deleting claim 26 [introduced in Amendment B] and substituting a new claim (which issued as patent claim 23) and included the limitation “at least one circumferential ridge disposed about the inflatable cuff” and omitted the “continuously” language of Amendment B.

JA 30-31. The Board found it significant that other amendments were made to the relevant claim, which apparently convinced the examiner of the patentability of the claimed invention over the prior art, without regard to the proposed addition of the word “continuously” to the claims.

We find no error in the Board’s conclusion that TriVascular has failed to meet its burden of demonstrating the existence of a “clear and unmistakable” disclaimer that would have been evident to one skilled in the art. *Elbex Video*, 508 F.3d at 1371. Though Samuels offered the “*continuously* circumferential ridges” limita-

tion as one of several possible bases for distinguishing the prior art, the Examiner never adopted Samuels' proposed amendment as a reason for allowing the claims over the prior art. Since the Examiner ultimately allowed the claims over the prior art *without* the proposed amendment, it is difficult to see how a skilled artisan could interpret the proposed amendment as a disclaimer required for patentability. Indeed, Samuels offered several other amendments as possible bases for distinguishing the prior art: (1) a requirement that the stent use "inflatable protrusion(s) *without rigid components*"; (2) a requirement that the cuff of the stent have "a collapsible lumen"; and (3) a requirement that the cuff contain a friction-enhancing outer surface preventing "*movement of the cuff in a longitudinal direction with respect to the tubular structure.*" JA 707-08 (italics added to show proposed amendments to claims).

Following the proposed amendment, Samuels and the Examiner engaged in an interview. Subsequently, Samuels submitted new claims "[i]n accordance with the Examiner's instructions provided during [the] telephone interview," and further noted that "the appropriate claims have been canceled to omit redundancy." JA 721. The examiner then allowed the final submitted claims to issue, over the prior art, without the "*continuously circumferential ridges*" limitation. JA 722. During the IPR, the Board found that this subsequent prosecution history "shows that the positions of the Examiner and the patent applicant changed following a telephone interview," regarding the allowability of the claims without the "continuously" limitation. We find no error in the Board's finding that the examiner was convinced by these alternate claim amendments rather than the "continuously" circumferential ridges amendment. This finding is supported in the record, which shows that the Examiner entered the alternate amendments, while omitting the

“continuously” amendment. JA 721-22. Thus, the Board did not err in finding that no disclaimer applied.

TriVascular nonetheless argues that there must be “written evidence” to contradict an applicant’s concessions made in an amendment, and that “[w]here the record is devoid of any written documentation, no inferences can be made as to what the examiner relied upon or understood.” Appellant’s Br. 36. TriVascular contends that this proposition flows from three cases, *Litton Systems, Inc. v. Whirlpool Corp.*, 728 F.2d 1423 (Fed. Cir. 1984), *Genzyme Corp. v. Transkaryotic Therapies, Inc.*, 346 F.3d 1094 (Fed. Cir. 2003), and *Rohm & Haas Co. v. Crystal Chemical Co.*, 722 F.2d 1556 (Fed. Cir. 1983). TriVascular’s reliance on these cases is misplaced.

First, TriVascular argues that this court explained in *Litton* that failure to document the results of an interview with the examiner estopped the applicant from later contending that the “prosecution record is not true.” Appellant’s Br. 37 (citing *Litton*, 728 F.2d at 1439). *Litton* involved a case where an applicant elected to continue prosecution by filing a continuation application. *Litton* then had an examiner interview, the results of which were not documented. After the examiner interview, *Litton* filed an amendment clarifying that the continuation application was a continuation in part (“CIP”). Subsequently in litigation, *Litton* attempted to argue that, in the undocumented examiner interview, the examiner accepted *Litton*’s explanation that the continuation application did not contain new matter, and therefore should be entitled to the continuation application’s filing date. A review of the prosecution history in each case is necessarily context-specific. Unlike the present case, the examiner in *Litton* accepted *Litton*’s written filing, which characterized the application as a CIP. Furthermore, this court considered the prosecution history as a whole to find that *Litton* should be estopped from arguing that the record was “not true.” In contrast, here the examiner

never required the claim amendment upon which Tri-Vascular hinges its prosecution history disclaimer argument. Accordingly, *Litton* does not control the facts of this case.

*Genzyme* is similarly distinguishable. In *Genzyme*, the issue was whether an applicant's attempted last-minute amendment could omit a limitation that had been repeatedly emphasized throughout the prosecution history. In particular, "the deposit requirement, the specification, the applicant's arguments to distinguish prior art, the examiner's responses, and [applicant's expert's] declaration repeatedly stressed that the invention envisioned" inclusion of the claim limitation at issue. *Genzyme*, 346 F.3d at 1103. This court held that "[a] clarifying amendment at the last moment could not negate th[e] extensive public record" in which the applicant had repeatedly argued that a limitation was necessary to distinguish the claimed invention from the prior art. *Id.* Similarly, *Genzyme* supports the Board's rejection of prosecution history disclaimer in the present case, in which the Board considered the proper claim construction in view of "the complete prosecution history." JA 31.

Finally, unlike the present case, *Rohm* involved a claim of inequitable conduct based on a patent applicant's intentional misrepresentations in certain affidavits. *Rohm*, 722 F.2d at 1557. The central issue was whether the applicant was able to show that it had "cured" its prior misrepresentations during an examiner interview. *Id.* at 1572-73. In *Rohm*, the applicant provided "lengthy interview summaries" of the examiner interview, but the summaries failed to note whether the applicant informed the PTO "that any misrepresentations had been made or precisely where they had been made." *Id.* We held that "[s]uch express disclosure was necessary to meet [the applicant]'s duty, and would have alerted the PTO to the necessity of reconsidering rejections which had been withdrawn as a result of those submissions." *Id.* *Rohm*

clearly does not control or even inform the question of prosecution history disclaimer we consider in this case.

For the above reasons, we find no error in the Board's construction of the "circumferential ridges" claim limitation requiring the ridges to be continuous.

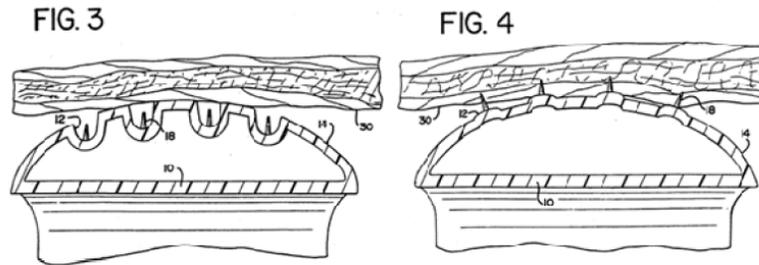
### C. Obviousness

TriVascular next argues that the Board should have found the '575 patent's claims invalid under the instituted ground of obviousness over Samuels '851 in view of Todd. As explained above, we find no error in the Board's claim construction of "circumferential ridges." For the reasons below, the Board did not err in finding that TriVascular failed to satisfy its burden of proving that the challenged claims of the '575 patent are invalid as obvious.

A patent is invalid "if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a) (2012); *see generally Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). Thus, a patent may be found invalid as obvious if "there are a finite number of identified, predictable solutions, [and] a person of ordinary skill has good reason to pursue the known options within his or her technical grasp." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). Although the *KSR* test is flexible, the Board "must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to *how* or *why* the references would be combined to produce the claimed invention." *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1368 (Fed. Cir. 2012) (emphases added) (internal quotations omitted).

The prior art forming the ground of the Board's decision being appealed are Samuels '851 in view of Todd, two

references directed at stent technology. Samuels '851 taught the use of inflatable protrusions containing penetrating spikes capable of securing the stent within the vessel wall. Figures 3 and 4 of Samuels '851 show the disclosed protrusions in both inflated and deflated form:



JA 512, Samuels '851, figs. 3 & 4.

Todd taught the use of non-penetrating “gripping protuberances” on the outer surface of the stent. The “gripping protuberances” disclosed in Todd are solid, however, in contrast to the hollow inflatable ridges taught in the '575 patent at issue.

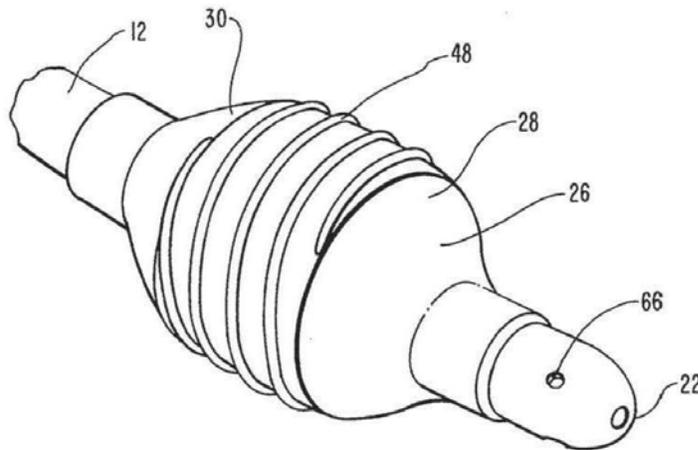


FIG. 7

JA 581, Todd, fig. 7.

Thus, a key point of distinction between the '575 patent and the prior art is that the '575 patent teaches the use of *inflatable, circumferential* ridges that do not penetrate the vessel wall.

TriVascular argues that the Board's conclusion on nonobviousness was erroneous because the Board improperly required the references to be physically "bodily incorporated" into each other, and because the Board ignored the state of the art and its predictability. TriVascular also argues that, contrary to the Board's findings, a skilled artisan would have been motivated to combine Samuels '851 and Todd by replacing the barbs of Samuels '851 with the gripping protuberances of Todd to obtain the desirable result of non-penetrating stent fixation. Thus, TriVascular argues, it would have been obvious for a skilled artisan to substitute the inflatable, penetrating barbs of Samuels '851 with the noninflatable, nonpenetrating protuberances of Todd. Appellant's Br. 45.

Samuels responds that the Board did not err in concluding that TriVascular failed to carry its burden of proving invalidity based on the combination of Samuels '851 and Todd. Samuels contends that TriVascular's arguments on obviousness are misguided because the Board did not require that TriVascular explain how Todd must be bodily incorporated into Samuels '851. Samuels further notes that the Board's findings that a skilled artisan would neither have had the motivation to combine nor a reasonable likelihood of success in combining Samuels '851 with Todd further supports the Board's conclusion on nonobviousness. We agree with Samuels that the Board's findings are supported by substantial evidence.

We find no error in the Board's rejection of TriVascular's argument that it would have been obvious to substitute the recessed barbs of Samuels '851 with the protuberances of Todd, since TriVascular's proposed

substitution would destroy the basic objective of the barbs, which is to *penetrate* surrounding tissue. See JA 18 (Board finding that the “recesses 12 of Samuels ’851 *function to project barbs 18 into surrounding tissue* when inflatable balloon cuff 10 is filled fully with fluid.”). Moreover, in order to meet the claimed limitations, not only the barbs but also the underlying recesses in Samuels ’851 would need to be replaced with inflatable non-penetrating protrusions. And, it would not have been obvious to substitute the inflatable barbed recesses with the non-penetrating protuberances of Todd because the protuberances taught in Todd were not inflatable, as recited in the asserted claims. JA 15-17 (“TriVascular, however, has not provided a declaration, or any other evidence, to establish that a person of ordinary skill in the art would understand Todd to disclose protuberances that are hollow, and themselves inflatable.”). Thus, the Board’s findings regarding the lack of a motivation to combine are supported by substantial evidence.

TriVascular next contends that the Board’s conclusion of nonobviousness is inconsistent with the Board’s findings in its Institution Decision, since the Board found that TriVascular had initially demonstrated a reasonable expectation of success in demonstrating obviousness. TriVascular argues that the Board should not have changed its view of the patent’s validity without clearly explaining why it had done so. In fact, this misguided theme pervades TriVascular’s briefs. Contrary to TriVascular’s assertions, the Board is not bound by any findings made in its Institution Decision. At that point, the Board is considering the matter preliminarily without the benefit of a full record. The Board is free to change its view of the merits after further development of the record, and *should do so* if convinced its initial inclinations were wrong. To conclude otherwise would collapse these two very different analyses into one, which we decline to do. If those determinations were somehow binding with

respect to the Board's final decision, as TriVascular urges, the patentee's appeal rights as to that second determination would be close to illusory. TriVascular's argument also fails to appreciate that there is a significant difference between a petitioner's burden to establish a "reasonable likelihood of success" at institution, and actually proving invalidity by a preponderance of the evidence at trial. Compare 35 U.S.C. § 314(a) (standard for institution of *inter partes* review), with 35 U.S.C. § 316(e) (burden of proving invalidity during *inter partes* review). The Board's findings in its Final Written Decision were thus not inconsistent with those in its Institution Decision; they were made under a qualitatively different standard.

After considering Samuels' expert's testimony, the Board found that, while a skilled artisan might have had a reasonable expectation of success in replacing *the entire recesses* of Samuels '851 with the protuberances of Todd, there was an insufficient motivation to substitute *just the barbs* of Samuels '851 with the protuberances of Todd. The Board's reasoning is supported by the teachings of Samuels '851 and Todd regarding the underlying purposes of the inventions claimed in each reference. First, Samuels '851 taught away from substituting only the barbs, since the barbs were the primary objective of the reference, allowing the stent to be anchored to the vessel. Second, replacing just the barbs of Samuels '851 would not have satisfied the "circumferential ridge" limitation, since the barbs were individual, discontinuous points, rather than a continuous circumferential ridge. Third, the gripping protuberances of Todd, even if substituted, would not satisfy the "inflatable protrusions" limitations of the challenged claims. JA 19-20. TriVascular has not met its burden of showing that the Board's findings are not supported by substantial evidence.

Though TriVascular asserts that the Board required it to prove how the references could be physically "bodily incorporated" within each other, we see no evidence

supporting TriVascular's assertion. Instead, the Board merely requested that TriVascular explain why it would have been obvious to replace just the barbs of Samuels '851 with the circumferential ridges of Todd, in view of the Board's findings regarding the stated purposes of each prior art reference. JA 440-41, Trial Transcript. Accordingly, we find TriVascular's assertions to be without merit.

As discussed above, the Board's findings regarding the lack of a sufficient motivation to combine and the lack of a reasonable expectation of success in combining the prior art are supported by substantial evidence. In view of these findings, we see no error in the Board's conclusion that TriVascular failed to satisfy its burden of proving that the challenged claims are invalid.

#### CONCLUSION

For the above reasons, we find no error in the Board's claim construction or its judgment that TriVascular has failed to meet its burden of demonstrating that the asserted claims are invalid as obvious. Accordingly, we affirm.

**AFFIRMED**