UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

QXMÉDICAL, LLC,

Plaintiff,

v.

VASCULAR SOLUTIONS, LLC; TELEFLEX INNOVATIONS S.À.R.L.; and ARROW INTERNATIONAL, INC.,

Defendants.

Case No. 17-CV-1969 (PJS/TNL)

ORDER

Courtland C. Merrill and Philip J. Kaplan, ANTHONY OSTLUND BAER & LOUWAGIE P.A., for plaintiff.

J. Thomas Vitt, Emily Justine Tait, Patrick J. O'Rear, and Sanjiv Prakash Laud, JONES DAY; Kenneth E. Levitt, DORSEY & WHITNEY, for defendants.

This lawsuit involves six patents—U.S. Patent Nos. 8,048,032 (the "'032 patent"), 8,142,413 (the "'413 patent"), RE45,380 (the "RE'380 patent"), RE45,760 (the "RE'760 patent"), RE45,776 (the "RE'776 patent"), and RE46,116 (the "RE'116 patent"). All six patents descend from a common patent application and share a common specification and common drawings. The patents are owned by defendant Teleflex Innovations S.à.r.l., whose parent corporation acquired defendant Vascular Solutions, LLC, in February 2017. A third defendant, Arrow International, Inc., has the right to sell

products practicing the patents. For convenience, the Court will refer to the defendants collectively as "Vascular Solutions."

In April 2017, Vascular Solutions accused plaintiff QXMédical, LLC of patent infringement. In response, QXMédical brought this action, seeking a declaration that its Boosting Catheter does not infringe any of Vascular Solutions's patents and that Vascular Solutions's patents are invalid. Vascular Solutions counterclaimed, seeking judgment against QXMédical for infringement.

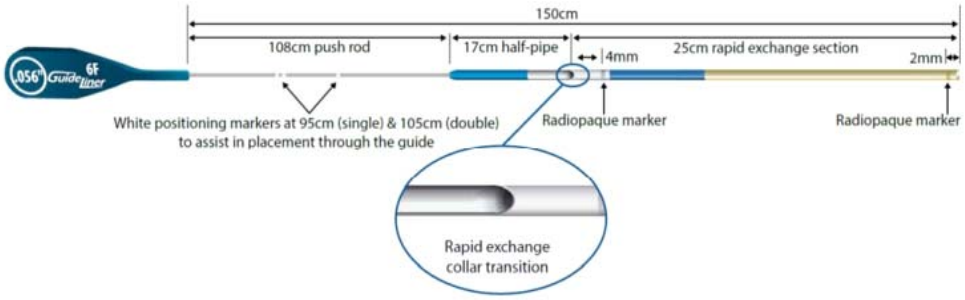
On October 30, 2018, the Court issued an order construing certain terms of the patents in suit pursuant to *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390-91 (1996). *See QXMédical, LLC v. Vascular Solutions*, No. 17-CV-1969 (PJS/TNL), 2018 WL 5617568, at *1 (D. Minn. Oct. 30, 2018). After the close of discovery, the parties filed cross-motions for summary judgment. For the reasons that follow, the Court mostly grants Vascular Solutions's motion, and mostly denies QXMédical's motion.

I. BACKGROUND

The Court will assume familiarity with its *Markman* order. Very briefly, the patents in suit relate to a medical device known as a "guide extension catheter." A guide extension catheter is used by a heart surgeon to deliver a balloon or stent into a coronary artery that has been narrowed by a buildup of plaque. The surgeon pushes the guide extension catheter though a larger catheter (known as the "guide catheter"),

and then pushes the balloon or stent through the guide extension catheter and into the coronary artery.

The GuideLiner catheter that Vascular Solutions manufactures is depicted in the following diagram:



ECF No. 125-22 at 32.[1] The GuideLiner catheter manufactured by Vascular Solutions—as well as the Boosting Catheter manufactured by QXMédical—are composed of three main parts: (1) a pushrod, (2) a side opening, and (3) a flexible tip. In this diagram, the pushrod is on the left, the side opening is in the middle (within the blue section), and the flexible tip is on the right (in yellow).

[1]When citing documents by ECF number, the Court cites the page number generated by the electronic docketing system rather than the document's internal pagination.

II. DISCUSSION

A. Standard of Review

Summary judgment is warranted "if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). A dispute over a fact is "material" only if its resolution might affect the outcome of the suit under the governing substantive law. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). A dispute over a fact is "genuine" only if "the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Id.* When considering a summary-judgment motion, the Court "must view the evidence and the inferences that may be reasonably drawn from the evidence in the light most favorable to the non-moving party." *Winthrop Res. Corp. v. Eaton Hydraulics, Inc.*, 361 F.3d 465, 468 (8th Cir. 2004).

B. Validity—Indefiniteness of "Substantially Rigid"

All of the claims asserted against QXMédical disclose a "substantially rigid" segment, which is informally referred to as the "pushrod." QXMédical argues that these claims are fatally indefinite because of the way that the Court defined "substantially rigid" in its *Markman* order. Both parties have moved for summary judgment on the issue.

"A claim is invalid for indefiniteness if its language, when read in light of the specification and the prosecution history, 'fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention.'" *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1377 (Fed. Cir. 2015) (citation omitted). Because a patent is presumed to be valid, an accused infringer must prove indefiniteness by clear and convincing evidence. *See Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 95 (2011). Summary judgment may be granted on the issue of indefiniteness when there is no genuine dispute as to any material fact. *See Akzo Nobel Coatings, Inc. v. Dow Chem. Co.*, 811 F.3d 1334, 1336 (Fed. Cir. 2016) (affirming a district court's grant of summary judgment that a patent is not invalid for indefiniteness).

In its *Markman* order, the Court adopted a functional definition of "substantially rigid," construing the term to mean "rigid enough to allow the device to be advanced within the guide catheter." *QXMédical*, 2018 WL 5617568, at *5. QXMédical does not actually argue that the term (as defined by the Court) is indefinite. In other words, QXMédical does not argue that a person of ordinarily skill in the art would have any difficulty determining whether a particular portion of a guide extension catheter is rigid enough to push a flexible tubular structure through a guide catheter.

Rather, QXMédical argues that the problem with the Court's definition is that a portion of a guide extension catheter could be *both* "substantially rigid" *and* "flexible."

Specifically, QXMédical contends that the material that comprises the tip portion (which must be "flexible") might be "rigid enough to allow the device to be advanced within the guide catheter" (and thus also "substantially rigid"). Likewise, the pushrod (which must be "substantially rigid") must be able to bend enough to navigate the vascular system of a human being (and thus must also be "flexible"). Under the Court's definition, says QXMédical, a person of ordinary skill would be unable to distinguish the "substantially rigid" portion of the device from the "flexible" portion.

The problem with QXMédical's argument is that its premise is flawed: Nothing in any of the patents in suit says that "substantially rigid" and "flexible" are mutually exclusive. In other words, nothing in any of the patents says that a segment of the device cannot be *both* "substantially rigid" *and* "flexible." Instead, the claims that disclose a "flexible tip" portion simply require that the substantially-rigid pushrod be "*more* rigid" than the flexible tip. *See, e.g.*, '032 at 10:38-40 (emphasis added). This is a comparative limitation—a limitation that would be superfluous if "substantially rigid" and "flexible" were mutually exclusive categories. *See Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006) ("[C]laims are interpreted with an eye toward giving effect to all terms in the claim.").

QXMédical's argument that "substantially rigid" and "flexible" are mutually exclusive is also belied by its own proposed constructions of those terms. During the

Markman proceedings, QXMédical asked the Court to define "substantially rigid" as "largely, but not wholly unable to bend," and "flexible" as "capable of bending." ECF No. 56 at 21. Obviously something that is "largely, *but not wholly* unable to bend" (and thus "substantially rigid" as QXMédical would define that term) is *also* "capable of bending" (and thus "flexible" as QXMédical would define that term). In other words, under QXMédical's own proposed definitions, anything that is "substantially rigid" would *necessarily* be "flexible" as well.

There is, at bottom, no evidence in the record supporting QXMédical's argument that a person of ordinary skill would be unable to distinguish between the "substantially rigid" pushrod and the "flexible" distal tip. The experts on both sides agree that a person of ordinary skill would have no trouble determining whether a pushrod is "rigid enough to allow the device to be advanced within the guide catheter." *See* ECF No. 134-2 at 4-5; ECF No. 137 at 31-32. And the experts on both sides agree that a person of ordinary skill would have no difficulty determining whether a substantially rigid pushrod is "more rigid" than a flexible tip portion. ECF No. 134-2 at 6; ECF No. 137 at 31-33.[2]

[2]Not all of the asserted claims describe the distal tip as "flexible," and the claims that do not are clearly not indefinite. QXMédical's indefiniteness challenge relies on the indeterminacy allegedly created by the interplay between "substantially rigid" and "flexible." There is no such interplay in claims that do not use the term "flexible."

Because there is no evidence—much less clear and convincing evidence—that the boundaries of the claims cannot be understood by a person of ordinary skill, the Court grants Vascular Solutions's motion for summary judgment on the issue of indefiniteness.

C. Validity—Recapture Rule

The '032 patent claims a pushrod "without a lumen." Three of the reissued patents—the RE'760, RE'776, and RE'116 patents—do not include this limitation, however, and thus those reissued patents claim pushrods that have lumens, as well as pushrods that do not. The parties dispute whether, by removing the "without a lumen" limitation from the reissued patents, Vascular Solutions violated the "recapture rule" and thereby rendered those patents invalid.

The recapture rule "prevents a patentee from regaining through reissue the subject matter that he surrendered in an effort to obtain allowance of the original claims." *In re Clement*, 131 F.3d 1464, 1468 (Fed. Cir. 1997). "To decide whether a patentee surrendered certain subject matter, [courts] must determine 'whether an objective observer viewing the prosecution history would conclude that the purpose of the patentee's amendment or argument' . . . [was] 'to overcome prior art and secure the patent.'" *Greenliant Sys., Inc. v. Xicor LLC*, 692 F.3d 1261, 1267 (Fed. Cir. 2012) (quoting *Kim v. ConAgra Foods, Inc.*, 465 F.3d 1312, 1323 (Fed. Cir. 2006)). A reissued claim is

invalid if it violates the rule against recapture. *MBO Labs., Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1313 (Fed. Cir. 2010). Whether a reissued claim violates the recapture rule is a question of law. *Medtronic, Inc. v. Guidant Corp.*, 465 F.3d 1360, 1373 (Fed. Cir. 2006).

Courts follow a three-step inquiry when deciding if a patentee has violated the recapture rule:

> "(1) first, we determine whether, and in what respect, the reissue[d] claims are broader in scope than the original patent claims; (2) next, we determine whether the broader aspects of the reissue[d] claims relate to subject matter surrendered in the original prosecution; and (3) finally, we determine whether the reissue[d] claims were materially narrowed in other respects, so that the claims may not have been enlarged, and hence avoid the recapture rule."

Greenliant Sys., 692 F.3d at 1267 (quoting *N. Am. Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 1349 (Fed. Cir. 2005)). "[T]he recapture rule applies only if the patentee surrendered subject matter in the original prosecution in order to overcome a prior art rejection." *Cubist Pharm., Inc. v. Hospira, Inc.*, 805 F.3d 1112, 1121 (Fed. Cir. 2015).

Here, the parties agree that the reissued claims are broader in scope than the original claims, as the reissued claims capture all pushrods, and not just pushrods without a lumen (step one). The parties also agree that the reissued claims were not materially narrowed in other respects, such that the overall scope of the reissued claims

is not broader than the original claims (step three). The parties disagree about step two. Specifically, the parties dispute whether Vascular Solutions added the "without a lumen" limitation during the prosecution of the '032 patent "in order to overcome a prior art rejection." *Id.*

There is no factual dispute about the history of the '032 patent's prosecution:

In May 2006, Vascular Solutions sought a patent for a guide extension catheter with a pushrod described as a "substantially rigid portion." ECF No. 125-3 at 27. This patent would have covered pushrods with and without lumens. The examiner denied the application as obvious in light of prior art. Specifically, the examiner concluded that the claims were "unpatentable over Niazi . . . in view of Solar." ECF No. 125-4 at 3. Solar discloses a rapid exchange balloon catheter with a pushrod "formed of a flexible wire, or, alternately, of spring hollow hypotubing." ECF No. 125-18 at 12. Thus, the prior art cited by the examiner included both a pushrod *with* a lumen (the Solar embodiment with hypotubing, *see* ECF No. 125-2 at 23 (describing a hypotube as a "hollow metal shaft")), and a pushrod *without* a lumen (the Solar embodiment with the wire pushrod, ECF No. 134-2 at 4).

In February 2010, Vascular Solutions filed new claims describing its pushrod as "an elongated structure . . . having a non-circular cross-section." ECF No. 125-9 at 4, 19. The examiner rejected those claims because they failed to comply with the written-

description requirement, 35 U.S.C. § 112(a), and they were obvious in light of prior art, ECF No. 125-10. The examiner wrote that "it would have been an obvious matter of design choice to a person of ordinary skill to modify [Solar's pushrod] to be non-circular . . . because a non-circular cross-section would have the ability to perform the same function as the rod taught by Solar with only the expected result of minimizing the profile of the rod inside the device." ECF No. 125-10 at 7.

In response, Vascular Solutions requested a continued examination and amended the proposed claim language to cover "non-tubular" and "non-circular" pushrods. ECF No. 125-11 at 7, 10. The examiner rejected the amendment as obvious and because it lacked an adequate written description. ECF No. 125-12.

In February 2011, Vascular Solutions amended its claims yet again, this time describing the pushrod as "more rigid . . . than[] the flexible tip portion." ECF No. 125-15 at 9, 22. In response, the examiner proposed an amendment describing the pushrod as a "rail structure without a lumen." Vascular Solutions accepted the proposal, and the examiner finally allowed the application. ECF No. 125-16. The examiner explained that he allowed the application because "the arrangement of a claimed rail structure with the claimed flexible tip that is insertable through a hemostatic valve is not taught or suggested by the prior art." *Id.* at 7.

The question for this Court is whether this prosecution history provides clear and convincing evidence that Vascular Solutions surrendered pushrods that have lumens in order to overcome a prior-art rejection. The complication, of course, is that the "without a lumen" limitation was proposed by the examiner, not Vascular Solutions. The examiner did not explain why he proposed that particular limitation, and Vascular Solutions did not explain why it accepted the limitation. Moreover, whatever the motivations of the examiner and Vascular Solutions, it is absolutely clear that the "without a lumen" limitation was not *in fact* necessary to overcome the prior art, as Solar disclosed pushrods without lumens.

QXMédical nevertheless argues that Vascular Solutions surrendered pushrods that have lumens in order to overcome a prior-art rejection. In support of its argument, QXMédical cites language in the Manual of Patent Examining Procedure ("the manual") addressing the following situation: Suppose that a patent application claims A+B+C. Suppose further that the examiner denies the application because the prior art already discloses A+B+C. If the applicant adds limitation D to A+B+C without explaining why—and if the application gets approved—then, according to the manual, "it must be presumed that the D limitation was added to obviate the rejection" even if "there is no argument as to the addition of limitation D." M.P.E.P § 1412.02.

According to QXMédical, the hypothetical case described in the manual is materially identical to the facts of this case. Vascular Solutions submitted a patent application claiming all pushrods. The examiner denied the application. Vascular Solutions then added the "without a lumen" limitation at the examiner's suggestion, without any explanation as to why such a limitation was necessary. The application was approved. And thus, argues QXMédical, the manual directs the Court to presume that the "without a lumen" limitation was added to overcome prior art.

The Court has its doubts, as QXMédical's argument overlooks the fact that the hypothetical case described in the manual is distinguishable from this case in one crucial respect: In the hypothetical case described in the manual, the D limitation added a limitation that was *not* taught by the prior art. Here, however, the "without a lumen" limitation *was* taught by the prior art. It makes no sense to presume that the "without a lumen" limitation was added to overcome prior art, when it is clear that the prior art disclosed a pushrod without a lumen. *See* ECF 134-2 at 4 (QXMédical's expert agreeing that Solar disclosed a pushrod without a lumen).

The Court will nevertheless assume (for the sake of argument) that QXMédical is correct and that the manual's so-called "presumption of surrender" applies. That

presumption is not dispositive, but is instead rebuttable.[3] The Court finds that there is ample evidence in the prosecution history to rebut the presumption:

First, as the Court has already explained, no rational patent examiner could have believed that the "without a lumen" limitation was necessary to overcome prior art. The examiner was intimately familiar with Solar,[4] and Solar clearly and undisputedly discloses a pushrod without a lumen. If the patent examiner was competent (as he is presumed to be[5]), he could not possibly have suggested adding "without a lumen" to escape prior art.

Second, in trying to discern the reason for the examiner's proposed amendment, the Court need not apply a presumption because the examiner *explained* the reason why

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[3]*See In re Clement*, 131 F.3d at 1469 ("Deliberately canceling or amending a claim in an effort to overcome a reference strongly suggests that the applicant admits that the scope of the claim before the cancellation or amendment is unpatentable, *but it is not dispositive* because other evidence in the prosecution history may indicate the contrary." (emphasis added)).

[4]Patent Examiner Bradley J. Osinski wrote all six rejections of Vascular Solutions's '032 patent applications. *See* ECF Nos. 125-4, 125-6, 125-8, 125-10, 125-12, 125-14. Every one of those rejections discusses Solar, and every one of those discussions specifically mentions Solar's pushrod.

[5]This presumption is well-supported by case law. *See K/S Himpp v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1369 (Fed. Cir. 2014) ("The assumption that PTO examiners will use their knowledge of the art when examining patents is the foundation for the presumption in 35 U.S.C. § 282(a) that issued patents are valid."); *see also Microsoft Corp.*, 564 U.S. at 97 (explaining that § 282 codified the common-law presumption of patent validity based on "the basic proposition that a government agency such as the [PTO] was presumed to do its job" (citation and quotation marks omitted)).

he allowed the amended application: "While many of the structures are known, the arrangement of a claimed rail structure with the claimed flexible tip that is insertable through a hemostatic valve is not taught or suggested by the prior art." ECF No. 125-16 at 7. This explanation is admittedly vague in some respects, but it is clear on one point: The addition of the "without a lumen" limitation had nothing to do with the examiner's decision to allow the application. Indeed, the examiner does not even *mention* that limitation in explaining why he allowed the application.[6]

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[6]QXMédical relies on *MBO Laboratories, Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306 (Fed. Cir. 2010), in which the Federal Circuit invalidated four claims of a reissued patent because the patentee violated the recapture rule. But *MBO Laboratories* is distinguishable. In *MBO Laboratories*, the inventor of a hypodermic safety syringe successfully persuaded the examiner to allow its original patent application by pointing out that two items of prior art involved a guard that moved forward to cover a fixed needle, whereas its invention involved a needle being retracted backward into a fixed guard. *Id.* at 1315. In the reissued patent, however, the inventor claimed both guards that moved forward to cover needles and needles that moved backward into guards. *Id.* The patentee argued (among other things) that because both techniques were disclosed in the prior art, the patentee could not have surrendered either technique when it emphasized its retractable needle. *Id.* at 1316. The Federal Circuit disagreed, holding, in essence, that when a patentee clearly and unmistakably argues in the prosecution of its original patent that its invention does not cover certain subject matter in order to overcome *some* prior art, the recapture rule applies even if the surrender of the subject matter did not overcome *other* prior art. *Id.* ("The fact that some of the prior art may have disclosed a retractable needle cannot save MBO's reliance on its retractable needle to distinguish other prior art.").

Here, however, Vascular Solutions did not argue that the "without a lumen" limitation was necessary to overcome *any* prior art. Indeed, Vascular Solutions did not even *propose* the "without a lumen" limitation. Moreover, the examiner who did propose the limitation (and who eventually allowed the '032 patent) never expressed

(continued...)

For these reasons, the Court finds that Vascular Solutions has overcome any presumption that the "without a lumen" limitation was added to overcome prior art. Because there is no genuine dispute that Vascular Solutions did not surrender pushrods with lumens "in order to overcome a prior art rejection," *Cubist Pharm.*, 805 F.3d at 1121, the Court will grant Vascular Solutions's motion for summary judgment that the RE'760, RE'776, and RE'116 patents do not violate the recapture rule.

D. Infringement—Lumen

The '032, '413, and RE'380 patents all disclose a pushrod "without a lumen." Both parties move for summary judgment on whether the Boosting Catheter meets this limitation.

1. Literal Infringement

Vascular Solutions argues that the Boosting Catheter literally infringes the asserted claims because it does not have a lumen. QXMédical argues that the Boosting Catheter does not literally infringe the asserted claims because it does have a lumen. The Court is inclined to agree with Vascular Solutions, but, for the reasons discussed on the record at the hearing, the Court finds that a reasonable jury could agree with either

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[6](...continued)
the opinion that the "without a lumen" limitation was necessary to overcome prior art. To the contrary, the examiner made it clear that he was concerned about a particular item of prior art (Solar) that disclosed pushrods without lumens. The limitation that he proposed obviously was not intended to overcome that aspect of the prior art.

party, and thus the Court denies both summary-judgment motions on literal infringement. This issue will be tried.

2. Doctrine of Equivalents

Next, Vascular Solutions argues that, even if the Boosting Catheter does not literally infringe—that is, even if the Boosting Catheter does have a lumen—the Boosting Catheter nevertheless infringes under the doctrine of equivalents. "Infringement under the doctrine of equivalents requires the patentee to prove that the accused device contains an equivalent for each limitation not literally satisfied." *Wi-Lan, Inc. v. Apple, Inc.*, 811 F.3d 455, 463 (Fed. Cir. 2016). "An element in the accused product is equivalent to a claim limitation if the differences between the two are 'insubstantial' to one of ordinary skill in the art." *Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, 289 F.3d 801, 812 (Fed. Cir. 2002) (citation omitted). Whether an accused device infringes under the doctrine of equivalents is a question of fact. *Akzo Nobel Coatings, Inc.*, 811 F.3d at 1342. Consequently, summary judgment of noninfringement is appropriate only when "the evidence is such that no reasonable jury could determine two elements to be equivalent." *Id.* (citation and quotation marks omitted).

The Court concludes that the question of infringement under the doctrine of equivalents, like the question of literal infringement, must be tried to a jury. The parties have submitted conflicting expert reports regarding whether the Boosting Catheter's

pushrod (which has a microscopic hollow space that runs its length) is the equivalent of a pushrod without a lumen. Resolving this dispute is "an intensely factual inquiry" best suited for a jury. *Toro Co. v. White Consol. Indus., Inc.*, 266 F.3d 1367, 1369 (Fed. Cir. 2001) (citation and quotation marks omitted).

QXMédical raises several defenses to application of the doctrine of equivalents, including (1) claim vitiation, (2) prosecution-history estoppel, and (3) ensnarement of prior art. These are all legal defenses that the Court—not the jury—must resolve. *See Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39 n.8 (1997) (explaining that "the various legal limitations on the application of the doctrine of equivalents" such as claim vitiation or prosecution-history estoppel are to be "determined by the court"); *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1324 (Fed. Cir. 2009) (ruling that ensnarement is a "question of law" which must be decided by the court).

The Court need not rule on the merits of these defenses at this time, however. If the jury finds literal infringement, then the jury will not be asked to determine whether the Boosting Catheter infringes under the doctrine of equivalents, and the Court will not have to rule on QXMédical's defenses to that doctrine. Likewise, if the jury finds no literal infringement and no infringement under the doctrine of equivalents, the Court will not have to rule on QXMédical's defenses. Only if the jury finds that the Boosting Catheter does not literally infringe but does infringe under the doctrine of equivalents

will the Court be required to rule on QXMédical's defenses. *See G. David Jang, M.D. v. Boston Sci. Corp.*, 872 F.3d 1275, 1288 (Fed. Cir. 2017) (giving district courts discretion about when and how to rule on an ensnarement defense). In that event, QXMédical may raise its defenses "on a motion for judgment as a matter of law at the close of the evidence and after the jury verdict." *Warner-Jenkinson Co.*, 520 U.S. at 39 n.8.

E. Infringement—"One French"

The patents in suit generally disclose a guide extension catheter "for use with" a guide catheter. *See, e.g.*, '032 at 10:21; RE'380 at 10:57; RE'776 at 13:36, 15:15. Certain of the asserted claims—specifically, claim 8 of the '032 patent (apparatus), claim 8 of the RE'380 patent (system), claims 25 and 48 of the RE'760 patent (system), claims 30 and 53 of the RE'776 patent (apparatus), and claim 25 of the RE'116 patent (method)—require that the "tubular structure" of the guide extension catheter have a "cross-sectional inner diameter" that is "not more than one French smaller than the cross-sectional inner diameter of the guide catheter." *See, e.g.*, '032 at 11:17-20. As noted, these claims include apparatus, system, and method claims.

Vascular Solutions argues that one device manufactured by QXMédical—its 6 French Boosting Catheter model BC57-150 ("6F Boosting Catheter")—directly infringes the apparatus claims. Vascular Solutions also argues that QXMédical has

induced others to infringe the system and method claims. The Court will first analyze the apparatus claims, and then turn to the system and method claims.

1. Direct Infringement of the Apparatus Claims

The 6F Boosting Catheter plainly meets the "for use with" limitation. "The Federal Circuit has generally held that use of the word 'for' within apparatus claims provides functional limitations that 'describe capabilities . . . .'" *M2M Sols. LLC v. Motorola Sols., Inc.*, No. 12-33-RGA, 2016 WL 70814, at *4 (D. Del. Jan. 6, 2016) (quoting *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1204-05 (Fed. Cir. 2010)); *see Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1216-17 (Fed. Cir. 2014) (explaining how "*for* preventing," "*for* arranging," and "*for* obtaining" are examples of claim limitations reciting capability). Here, "for use with" recites a capability that the patented device must have—specifically, the capability of being used with a guide catheter. *See HSM Portfolio LLC v. Elpida Memory Inc.*, 160 F. Supp. 3d 708, 720 (D. Del. 2016) (interpreting the claim language "for receiving" to recite capability); *McAfee Enters., Inc. v. Yamaha Corp.*, CV 2:16-2562 BRO (FFM), 2016 WL 6920675, at *2 (C.D. Cal. June 24, 2016) (interpreting the claim language "for counting" to recite capability).

The Federal Circuit has repeatedly explained that a claim limitation reciting capability is satisfied so long as the accused device is "reasonably capable" of being used in an infringing manner. *Ericsson, Inc.*, 773 F.3d at 1217; *see Finjan, Inc.*, 626 F.3d

at 1204 ("[T]o infringe a claim that recites capability and not actual operation, an accused device 'need only be capable of operating' in the described mode." (citation omitted)). Here, there is no dispute that the 6F Boosting Catheter is "reasonably capable" of being used with a guide catheter. Without question, then, the 6F Boosting Catheter meets the "for use with" limitation.

Unfortunately for Vascular Solutions, however, the 6F Boosting Catheter does *not* meet the one-French limitation. The one-French limitation recites structure, not capability. An accused device cannot meet a structural limitation in an apparatus claim unless the limitation is present in the device as it comes off of the assembly line. The fact that the accused device is "reasonably capable of being put into the claimed configuration is insufficient for a finding of infringement." *Ball Aerosol & Specialty Container, Inc. v. Ltd. Brands, Inc.*, 555 F.3d 984, 995 (Fed. Cir. 2009).

To meet the one-French limitation, then, a device must incorporate *both* a guide catheter *and* a guide extension catheter, and the guide extension catheter must not be more than one French smaller than the guide catheter. The 6F Boosting Catheter obviously does not meet this limitation, as it is only a guide extension catheter. It does not incorporate a guide catheter of any size.

QXMédical does not manufacture guide catheters, sell guide catheters, or package the 6F Boosting Catheter with a guide catheter. Instead, a surgeon will

purchase a 6F Boosting Catheter from QXMédical and pair it with a guide catheter that the surgeon purchases from another manufacturer. Depending on the size of the guide catheter chosen by the surgeon, the 6F Boosting Catheter may or may not be more than one French smaller than the guide catheter. Critically, though, that decision will be made by the surgeon based on the needs of the patient, not by QXMédical.

This case resembles *Cross Medical Products, Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293 (Fed. Cir. 2005). Cross Medical owned an apparatus patent covering an orthopedic surgical implant used to stabilize and align the bones of a patient's spine. The asserted claim recited a "device for the posterior stabilization of one or more bone segments of the spine" comprising, among other things, "a lower bone interface operatively joined to said bone segment." *Id.* at 1299 (emphasis omitted). The district court construed "operatively joined" to mean "connect[ed] during a surgical procedure," and further defined "connect[ed]" to mean "in contact." *Id.* at 1305.

Cross Medical argued that the "operatively joined" limitation was directed to capability, not structure, and thus the accused device (manufactured by Medtronic) infringed because it was capable of being operatively joined to a bone segment. Medtronic argued that the "operatively joined" limitation was directed to structure, not capability, and thus the accused device did not infringe because, as it came off of the assembly line, it was not "operatively joined" to a bone segment.

The Federal Circuit agreed with Medtronic, finding that the "operatively joined" limitation "does not require that the interface be merely 'capable' of contacting bone; the claim has a structural limitation that the anchor seat be in contact with bone." *Id.* at 1311. The Federal Circuit held that "Medtronic does not directly infringe" because it "does not itself make an apparatus with the 'interface' portion in contact with bone." *Id.* According to the Federal Circuit, "if anyone makes the claimed apparatus, it is the surgeons." *Id.*

Like the "operatively joined" limitation in *Cross Medical*, the one-French limitation is directed to structure, not capability. The 6F Boosting Catheter does not meet that structural limitation because, as it comes off the assembly line, its "tubular structure" does not have a "cross-sectional inner diameter" that is "not more than one French smaller than the cross-sectional inner diameter of the guide catheter." '032 at 11:17-20. That limitation can be met only later, after a surgeon—a third party over whom QXMédical has no control—chooses to pair the 6F Boosting Catheter with a guide catheter of a particular size. And thus, "if anyone makes the claimed apparatus, it is the surgeons." *Cross Medical*, 424 F.3d at 1311.[7] QXMédical is entitled to summary

[7] *See also Omega Patents, LLC v. CalAmp Corp.*, 920 F.3d 1337, 1345 (Fed. Cir. 2019) (holding that an accused infringer was entitled to JMOL of no direct infringement where the patentee "[did] not provide all the required claim elements" because a third party provided the cell tower which enabled all of the limitations of the systems claim to be met); *Acantha LLC v. DePuy Orthopaedics Inc.*, No. 15-C-1257, 2018 WL 1951228, at

(continued...)

judgment that its 6F Boosting Catheter does not directly infringe any apparatus claim that includes the one-French limitation.[8]

2. Indirect Infringement of the System and Method Claims[9]

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[7](...continued)
*4 (E.D. Wis. Apr. 25, 2018) (granting summary judgment of no direct infringement to defendants because the claim was not met until an independent third party assembled the accused product to create the completed structure); *Energy Heating, LLC v. Heat On-the-Fly, LLC*, No. 4:13-CV-10, 2013 WL 5954805, at *8 (D.N.D. Nov. 6, 2013) (refusing to find infringement where the "claimed apparatus is not complete until the final limitation" is fulfilled, "not by [the accused infringer], but by [a third party]"); *Lutron Elecs. Co. v. Crestron Elecs., Inc.*, 970 F. Supp. 2d 1229, 1233-36 (D. Utah 2013) (refusing to find infringement where the accused device omitted a structural limitation that would not be met until the accused infringers sold the device to the distributors who then made changes which met the claim limitation).

[8]Vascular Solutions devotes three sentences of its 60 pages of briefing to arguing that QXMédical directly infringed the apparatus claims containing the one-French limitation when it *tested* the 6F Boosting Catheter. Although "[t]esting is a use of the invention that may infringe under § 271(a)," *Waymark Corp. v. Porta Sys. Corp.*, 245 F.3d 1364, 1366 (Fed. Cir. 2001), the factual record and legal analysis that the parties have provided are not adequate to allow the Court to rule on Vascular Solutions's claim as a matter of law. The claim will have to be tried.

[9]In its briefing and during oral argument, Vascular Solutions appeared to argue that QXMédical *induced* infringement when it tested its own products. This is an odd argument. If QXMédical committed direct infringement during product testing, then it can be held liable for that direct infringement, but it cannot also be held liable for inducing itself to infringe. If QXMédical did not commit direct infringement during product testing, then it obviously cannot be held liable for inducing infringement, because there *was* no infringement. *See AIDS Healthcare Found. v. Gilead Sci., Inc.*, 890 F.3d 986, 992-93 (Fed. Cir. 2018) (finding no induced infringement where there was no underlying act of direct infringement).

Vascular Solutions alleges that a surgeon who uses a 6F Boosting Catheter with a guide catheter that has a lumen of .070 inches or less directly infringes system and method claims containing the one-French limitation. Its math is as follows: The 6F Boosting Catheter has an inner diameter of .057 inches. One French equals .0131 inches. Thus, if the 6F Boosting Catheter is used with a guide catheter that has a lumen of .070 inches or less, the one-French limitation is met; if it is used with a guide catheter that has a lumen of .071 inches or more, the limitation is not met.

Vascular Solutions further argues that QXMédical should be held liable for inducing any such infringement by a surgeon. "Whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). In order to hold QXMédical liable for induced infringement, Vascular Solutions must establish (1) an underlying act of direct infringement by a surgeon (or someone else), *Limelight Networks, Inc. v. Akamai Techs., Inc.*, 134 S. Ct. 2111, 2115 (2014); and (2) that QXMédical "took an affirmative act to encourage infringement with the knowledge that the induced acts constitute patent infringement," *Microsoft Corp. v. DataTern Inc.*, 755 F.3d 899, 904 (Fed. Cir. 2014).

a. Underlying Act of Direct Infringement

Vascular Solutions does not have evidence that anyone has ever directly infringed one of its system or method claims, with one exception: Dr. Yale Wang—a heart surgeon who is affiliated with QXMédical—performed all of the claimed steps when, in the course of operating on a patient, he used a 6F Boosting Catheter with a .070 guide catheter. ECF No. 134-2 at 14-15. Thus, Vascular Solutions has shown that the method claim has been directly infringed, *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020, 1022 (Fed. Cir. 2015) (en banc) (per curiam) ("Direct infringement under § 271(a) occurs where all steps of a claimed method are performed by or attributable to a single entity."), and that the systems claims have been directly infringed, *Georgetown Rail Equip. Co. v. Holland L.P.*, 867 F.3d 1229, 1239 (Fed. Cir. 2017) ("[D]irect infringement by use of a system claim requires a party . . . to use each and every . . . element of a claimed system." (citation and quotation marks omitted)).

b. Inducement

In order to hold QXMédical liable for Dr. Wang's single instance of infringement, Vascular Solutions must prove that QXMédical took an affirmative act with the specific intent of inducing Dr. Wang to infringe. *See Cleveland Clinic Found. v. True Health Diagnostics LLC*, 859 F.3d 1352, 1364 (Fed. Cir. 2017); *Tegal Corp. v. Tokyo Electron Co.*, 248 F.3d 1376, 1378-79 (Fed. Cir. 2001). "[M]ere inaction" in the face of infringement by a

third party is not sufficient. *Tegal Corp.*, 248 F.3d at 1379; *see Takeda Pharm. U.S.A., Inc. v. West-Ward Pharm. Corp.*, 785 F.3d 625, 630-31 (Fed. Cir. 2015) (selling a product while knowing that an unaffiliated third party may engage in infringing uses in not enough to create inducement liability); *see also Beverly Hills Fan Co. v. Royal Sovereign Corp.*, 21 F.3d 1558, 1569 (Fed. Cir. 1994) (explaining that "active inducement of infringement requires the *commission* of an affirmative act"). Vascular Solutions must also show that the affirmative act taken by QXMédical in fact led Dr. Wang to infringe. *See Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1274 (Fed. Cir. 2004) ("To prevail under a theory of indirect infringement, Dynacore must first prove that the defendants' actions led to direct infringement of the [patent]."); *see also DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1304 (Fed. Cir. 2006) (en banc) (explaining that the "plaintiff has the burden of showing that the alleged infringer's actions induced infringing acts").

Vascular Solutions cannot meet its burden. Vascular Solutions provided no evidence that QXMédical engaged in any "affirmative act" with the specific intent to induce Dr. Wang to infringe, much less any evidence that any such act led to Dr. Wang's infringing conduct. Vascular Solutions points out that QXMédical has repeatedly said—in the patents themselves, in its submissions to the Food and Drug Administration, in its instructions for use, and in its marketing materials—that its 6F Boosting Catheter is generally compatible with "guide catheters" or "standard guide

catheters" or "6F guide catheters." Because guide catheters come in both "infringing" (.070 inches or smaller) and "non-infringing" (.071 inches or larger) sizes, Vascular Solutions argues that QXMédical's communications are the type of affirmative conduct that can given rise to liability for induced infringement.

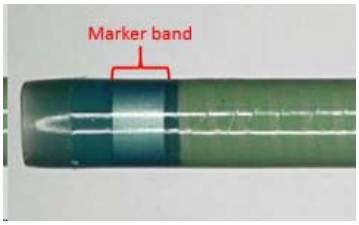
The Court disagrees. In its instructions for use, QXMédical specifically instructs surgeons *not* to use the 6F Boosting Catheter with guide catheters that are .070 inches or smaller. ECF No. 125-23 at 5-6. QXMédical does so not for any medical reason, but (presumably) to prevent surgeons from directly infringing any of Vascular Solutions's patents, and to protect QXMédical from induced-infringement claims. Given that QXMédical instructs surgeons *not* to infringe—and given the broad nature of QXMédical's general communications about the compatibility of the 6F Boosting Catheter with standard guide catheters—the Court does not believe that a reasonable jury could find that these communications represent affirmative acts undertaken with the specific intent to induce surgeons to infringe. And, in any event, the only instance of direct infringement of which Vascular Solutions is aware is a single procedure conducted by Dr. Wang, and Vascular Solutions has no evidence that any of the challenged communications were read by Dr. Wang or had any impact on his decision to use a 6F Boosting Catheter with a .070-inch guide catheter during that procedure.

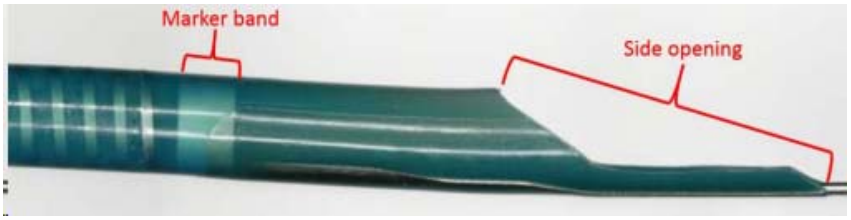
For these reasons, the Court grants summary judgment to QXMédical on Vascular Solutions's induced-infringement claims.

F. Infringement—Side Opening

Three of the reissued patents require the side opening of the guide extension catheter to be more rigid than the tubular structure.[10] RE'760 at 14:6-7, 15:51-53; RE'776 at 13:41-49, 15:22-28; RE'116 at 17:21-24. Both parties move for summary judgment on whether the Boosting Catheter meets this limitation.[11]

As illustrated below, the tubular structure of the Boosting Catheter contains two marker bands, one near the side opening and the other near the distal end:





[10]The patents use different language to convey the same basic idea: the portion of the guide extension catheter that contains or comprises the opening to the tubular structure must be more rigid than the tubular structure itself. *See, e.g.*, RE'760 at 14:5-7 (claiming a "material forming the segment defining the side opening" that is "more rigid than the tubular structure"); RE'776 at 15:22-28 (claiming a "segment defining the partially cylindrical opening" that is "formed from a material having a greater flexural modulus than a flexural modulus of the tubular structure"). For ease of reference, the Court will refer simply to the "side opening" being more rigid than the "tubular structure."

[11]The parties do not agree on what counts as the "segment defining the side opening" on the Boosting Catheter. As the parties acknowledged at oral argument, however, the Court need not resolve that dispute in order to rule on QXMédical's "marker band" defense.

ECF No. 124 at 33.

QXMédical asserts that the material forming these marker bands is more rigid than the material forming the side opening. Thus, says QXMédical, the Boosting Catheter does not infringe because, thanks to the presence of the marker bands, the Boosting Catheter's side opening is not more rigid than its tubular structure. The Court will refer to this as the "marker-band defense."

Vascular Solutions has two responses. First, Vascular Solutions argues that QXMédical waived the marker-band defense by failing to adequately disclose the defense in its noninfringement chart. And second, Vascular Solutions argues that the marker-band defense fails because the Boosting Catheter's side opening is more rigid than its tubular structure, when the tubular structure is considered as a whole (as Vascular Solutions says it should be).

The Court agrees with Vascular Solutions that QXMédical did not provide adequate notice of its marker-band defense. The pretrial scheduling order required QXMédical to "indicate with specificity the elements, on the Claim Chart of the party alleging infringement . . . which it contends are absent" and "set forth *in detail* the basis for its contention that the element is absent." ECF No. 20 at 4 (emphasis added); *see also* ECF Nos. 45, 98, 106. QXMédical did not come close to following these instructions with respect to its marker-band defense. Instead, QXMédical's claim chart vaguely

asserted that the Boosting Catheter did not infringe the relevant claims because "the proximal opening to the Boosting Catheter tube is not more rigid than the distal end of the tube." ECF 134-14 at 4. That "disclosure" did nothing more than parrot the relevant claim language. It did not explain at all—much less "in detail"—*why* the element was absent. It gave Vascular Solutions no clue that QXMédical intended to argue that the element was not met because of the presence of the two marker bands in the tubular structure.

Had Vascular Solutions been given notice of QXMédical's marker-band defense, Vascular Solutions undoubtedly would have asked the Court during the *Markman* proceedings to construe the term "tubular structure" to mean, roughly speaking, "the tubular structure as a whole," rather than any isolated portion of the tubular structure. Indeed, in responding to QXMédical's marker-band defense, Vascular Solutions mostly relies on arguments about the meaning of "tubular structure." To resolve those arguments, the Court would have to conduct a second *Markman* proceeding, and then a second round of summary-judgment motions. The Court is unwilling to conduct—or force Vascular Solutions to endure—multiple *Markman* and summary-judgment proceedings. That is precisely why the Court ordered the parties to disclose their positions "in detail" in their claim charts.

QXMédical was on notice that violating the pretrial scheduling order could result in sanctions. The scheduling order itself warned that "[f]ailure to comply with any provision of this Order . . . shall subject the non-complying party . . . to any and all appropriate remedies, sanctions and the like." ECF No. 20 at 9; *see also* ECF Nos. 45, 98, 106. These remedies include "waiver of rights to object; exclusion or limitation of witnesses, testimony, exhibits and other evidence; . . . and/or any other relief that this Court may from time to time deem appropriate." *Id.* The Federal Rules of Civil Procedure likewise caution litigants that "the court may issue any just orders" to sanction a party who "fails to obey a scheduling or other pretrial order." Fed. R. Civ. P. 16(f)(1). Among the sanctions available for violating a scheduling order is "prohibiting the disobedient party from supporting or opposing designated claims or defenses, or from introducing designated matters in evidence." Fed. R. Civ. P. 37(b)(2)(A)(ii).

Because QXMédical violated the pretrial scheduling order by failing to disclose its marker-band defense, the Court will not permit QXMédical to assert that defense at this late date. The Court finds that such a sanction is warranted in light of the fact that QXMédical has no excuse for its failure to disclose its marker-band defense and the fact that permitting QXMédical to assert its marker-band defense at this point would prejudice Vascular Solutions and compromise the Court's ability to manage this

litigation. *See Changzhou Kaidi Elec. Co. v. Okin Am., Inc.*, 112 F. Supp. 3d. 330, 337-38 (D. Md. 2015) (barring consideration of invalidity theories as a sanction for not disclosing those theories in the manner required by the local rules); *see also SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d 1278, 1292 (Fed. Cir. 2005) (granting "broad deference to the trial court's application of local procedural rules in view of the trial court's need to control the parties and flow of litigation before it" and affirming a district court's exclusion of evidence pertaining to theories of claim construction and infringement not disclosed as required by the local patent rules and the court's scheduling order).

Vascular Solutions has moved for summary judgment that the Boosting Catheter meets the limitation that the side opening of the guide extension catheter must be more rigid than the tubular structure. The only defense that QXMédical has asserted to Vascular Solutions's motion is the marker-band defense. Because the Court has held that QXMédical is precluded from asserting that defense, the Court grants Vascular Solutions's motion. *See Hologic, Inc. v. SenoRx, Inc.*, No. C-08-0133 RMW, 2009 WL 8760730, at *14 (N.D. Cal. Oct. 30, 2009) (granting defendant's summary-judgment motion for noninfringement when the plaintiff failed to "disclose a theory of infringement until after the claim construction, the close of fact and expert discovery, and opening summary judgment briefs").

G. Validity—Anticipation

QXMédical argues that claim 53 of the RE'116 patent is invalid because it was anticipated by U.S. Patent No. 5,527,292 ("Adams"). "A patent is invalid for anticipation under 35 U.S.C. § 102 if a single prior art reference discloses each and every limitation of the claimed invention." *Purdue Pharma L.P. v. Epic Pharma, LLC*, 811 F.3d 1345, 1351 (Fed. Cir. 2016). As discussed above, one of the limitations of claim 53 is that the side opening of the guide extension catheter must be more rigid than the tubular structure. *See* RE'116 at 17:21-24 ("wherein the segment defining the side opening comprises a portion of the guide extension catheter that is more rigid than the distal end portion of the tubular structure"). And thus, to anticipate claim 53, Adams must disclose a side opening that is more rigid than the tubular structure.

Adams discloses a pushrod (formed of nitinol wire) and a tubular structure. ECF No. 125-27 at 21. Adams also discloses an opening in the tubular structure, which QXMédical characterizes as a "side opening." ECF No. 124 at 41. (More on that in a moment.) If Figure 10 of Adams is examined closely, it appears to show that the distal end of the push rod is partially embedded in the proximal end of the flexible tube alongside the opening. ECF No. 125-27 at 9. Thus, argues QXMédical, "[t]he 'side opening' portion of Adams is necessarily more rigid than the remaining distal portion

of the flexible tube because the 'side opening' contains the embedded pushrod," whereas the remaining portion of the tubular structure does not. ECF No. 124 at 41.

Vascular Solutions argues that QXMédical should be precluded from asserting this defense because, once again, QXMédical failed to disclose the defense in violation of the pretrial scheduling order. The Court agrees.

The pretrial scheduling order required QXMédical to provide a "detailed explanation of what it alleges the prior art shows and how that prior art invalidates the claim(s) asserted by the party alleging infringement," including "where in such prior art each element of the allegedly invalid claims may be found." ECF No. 20 at 6. These disclosures "must contain enough information to provide notice of the party's infringement contentions and defenses . . . ." *Stratasys, Inc. v. Microboards Tech. LLC*, No. 13-CV-3228 (DWF/TNL), 2015 WL 3869672, at *1 (D. Minn. June 23, 2015).

In response to the pretrial order, QXMédical identified Adams as one of many prior-art references and broadly alleged that the RE'116 patent was invalid on account of Adams and other prior art. But nowhere did QXMédical explain how Adams discloses each of the limitations contained in claim 53, including the requirement of a side opening that is more rigid than the tubular structure. Indeed, QXMédical's cursory discussion of Adams does not even *mention* the side opening. *See* ECF No. 140-2 at 4, 6.

This falls far short of providing the type of detailed explanation required by the scheduling order.

Because QXMédical violated the scheduling order, the Court will preclude it from arguing that claim 53 is invalid as anticipated by Adams. *See O2 Micro Int'l Ltd. v. Monolithic Power Sys., Inc.*, 467 F.3d 1355, 1367-70 (Fed. Cir. 2006) (affirming the district court's grant of summary judgment of noninfringement after ruling that the district court did not err by excluding evidence provided in violation of the pretrial scheduling order); *SanDisk Corp.*, 415 F.3d at 1292 (affirming a district court's exclusion of evidence pertaining to theories of claim construction and infringement not disclosed as required by the local patent rules and the court's scheduling order); *Neonatal Prod. Grp. v. Shields*, 276 F. Supp. 3d 1120, 1125-28 (D. Kan. 2017) (granting a motion to strike an infringement theory that was raised in violation of the pretrial scheduling order).

Even if the Court did not preclude QXMédical from arguing that claim 53 is invalid as anticipated by Adams, the Court would reject the defense on the merits. Again, Adams does not anticipate claim 53 unless it "discloses each and every limitation" of that claim. *Purdue Pharma*, 811 F.3d at 1351. One of claim 53's limitations is that the guide extension catheter have a "side opening." RE'116 at 17:21.

Both Adams and claim 53 disclose a pushrod attached to a hollow tubular structure, and both Adams and claim 53 disclose *an* opening in that tubular structure. But the openings differ in one crucial respect.

As the parties agree, the opening disclosed in Adams is created by cutting the tubular structure perpendicularly to its axis. In other words, the opening in Adams resembles the end of a straw or a garden hose, as is illustrated (although not very well) by Figure 10:

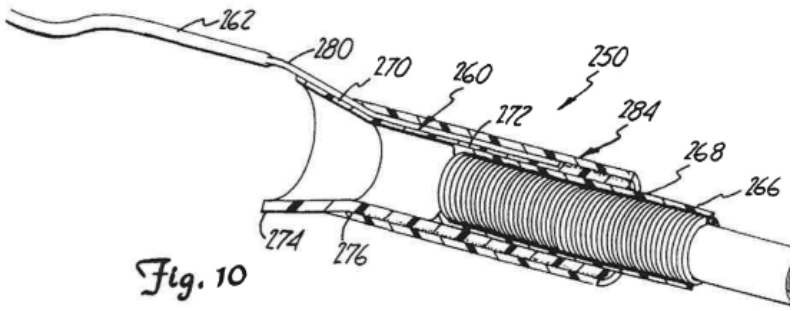
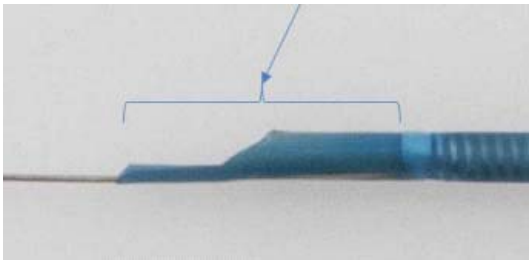


Fig. 10

ECF No. 125-27 at 9.

By contrast, the opening described in claim 53 is created by cutting the tubular structure at an angle, so that a portion of the side of the tube is exposed. The type of angled opening disclosed in claim 53 is illustrated by this photograph of the GuideLiner Catheter:



ECF No. 125-22 at 404.

As these figures illustrate, Adams discloses an *end* opening, while claim 53 discloses a *side* opening. The only way to insert something into the tubular structure disclosed in Adams is through its end (just as the only way to insert something into a straw or a garden hose is through its end). But the angled opening disclosed by claim 53 permits entry into the tubular structure through its side—a much easier passage.

The Court acknowledges that a patent examiner has described Adams as disclosing "a segment defining a side opening," ECF No. 140-4 at 10, reflecting the examiner's view (shared by QXMédical) that "an end is . . . one of the three sides of a cylinder," ECF No. 125-14 at 12. The Court respectfully disagrees with the examiner, to whom the Court is not required to defer.[12] The problem with the examiner's view is

[12]*See Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1042 (Fed. Cir. 2019) (explaining that courts review the Patent Trial and Appeal Board's interpretation of claim language de novo); *SRAM Corp. v. AD-II Eng'g, Inc.*, 465 F.3d 1351, 1359 (Fed. Cir. 2006) ("[T]his court is not bound by the PTO's claim interpretation because we review claim construction *de novo*.").

that it renders the term "side" completely superfluous. Tubes have only ends and sides. If every end is a side, then every opening in a tube—no matter the shape or location of the opening—is a "side" opening. The word "side"—which is used dozens of times in the patents in suit to modify "opening"— would be redundant. (At oral argument, QXMédical's attorney was unable to provide a single example of an opening in a tube that would *not* be a "side opening" under the examiner's interpretation of "side.")

Because "interpretations that render some portion of the claim language superfluous are disfavored," *Power Mosfet Techs., L.L.C. v. Siemens AG*, 378 F.3d 1396, 1410 (Fed. Cir. 2004), the Court agrees with Vascular Solutions that Adams does not disclose a "side opening" and therefore does not anticipate claim 53 of RE'116. *See Gen. Am. Transp. Corp. v. Cryo-Trans, Inc.*, 93 F.3d 766, 770 (Fed. Cir. 1996) (rejecting the district court's construction because it rendered claim language superfluous).

H. Vascular Solutions's Summary-Judgment Motion on Infringement

Vascular Solutions moves for summary judgment that the Boosting Catheter infringes claims 25, 36, 52, and 53 of the RE'776 patent. Vascular Solutions argues that all of the limitations of those claims are met, including the requirements that: (1) the pushrod be "substantially rigid" (claim 25); (2) the angled proximal end of the tubular structure have at least "one inclined region that tapers into a non-inclined region"

(claim 36); and (3) the angled proximal end of the tubular structure have "at least two inclined regions" (claims 52 and 53).

The only defense that QXMédical asserts to Vascular Solutions's motion (in addition to the defenses that the Court has already rejected) is the argument that the claim limitations that the Court has just identified are present in the prior art.[13] That may or may not be true, but it is irrelevant to the question of whether the limitations are met. The Court finds that the Boosting Catheter meets all of the limitations of claims 25, 36, 52, and 53 of the RE'776 patent, and therefore grants Vascular Solutions's motion for a declaration of infringement.

I. Conclusion

To summarize, the Court holds as follows: First, none of the claims asserted against the Boosting Catheter are invalid as indefinite or anticipated or violate the recapture rule. Second, QXMédical does not infringe—directly or indirectly—the asserted "one French" claims of the '032, RE'380, RE'760, RE'776, and RE'116 patents. Third, the Boosting Catheter meets the "side opening" limitation of claims 25 and 48 of the RE'760 patent, claims 25 and 52 of the RE'776 patent, and claim 52 of the RE'116 patent. Fourth, the Boosting Catheter infringes claims 25, 36, 52, and 53 of the RE'776 patent. And finally, whether the Boosting Catheter also infringes the asserted "without

[13]QXMédical also asks the Court to revisit its construction of the term "substantially rigid." The Court declines to do so.

a lumen" claims of the '032, '413, and RE'380 patents—either literally or under the doctrine of equivalents—must be tried to a jury.

ORDER

Based on the foregoing, and on all of the files, records, and proceedings herein, IT IS HEREBY ORDERED THAT:

1. QXMédical's motion for summary judgment [ECF No. 122] is GRANTED IN PART AND DENIED IN PART as follows:
   a. QXMédical's motion is GRANTED to the extent that it seeks a declaration that the Boosting Catheter does not infringe—and that QXMédical does not induce any person to infringe—claim 8 of the '032 patent, claim 8 of the RE'380 patent, claims 25 and 48 of the RE'760 patent, claims 30 and 53 of the RE'776 patent, or claim 25 of the RE'116 patent (all of which include the one-French limitation).
   b. QXMédical's motion is DENIED in all other respects.
2. Vascular Solutions's motion for summary judgment [ECF No. 130] is GRANTED IN PART AND DENIED IN PART as follows:
   a. Vascular Solutions's motion is GRANTED to the extent that it:
      i. Seeks a declaration that the asserted claims of the patents in suit are not invalid as indefinite.

ii. Seeks a declaration that the asserted claims of the RE'760, RE'776, and RE'116 patents are not invalid under the recapture rule.

iii. Seeks a declaration that claim 53 of the RE'116 patent is not invalid as anticipated.

iv. Seeks a declaration that the Boosting Catheter meets the "side opening" limitations of claims 25 and 48 of the RE'760 patent, claims 25 and 52 of the RE'776 patent, and claim 52 of the RE'116 patent. And

v. Seeks a declaration that QXMédical infringes claims 25, 36, 52, and 53 of the RE'776 patent.

b. Vascular Solutions's motion is DENIED in all other respects.

Dated: October 2, 2019

s/Patrick J. Schiltz
Patrick J. Schiltz
United States District Judge