United States Court of Appeals for the Federal Circuit

HOLOGIC, INC., CYTYC SURGICAL PRODUCTS, LLC,
Plaintiffs-Appellants

v.

MINERVA SURGICAL, INC.,
Defendant-Cross-Appellant

2019-2054, 2019-2081

Appeals from the United States District Court for the District of Delaware in No. 1:15-cv-01031-JFB-SRF, Senior Judge Joseph F. Bataillon.

Decided: August 11, 2022

MATTHEW WOLF, Arnold & Porter Kaye Scholer LLP, Washington, DC, argued for plaintiffs-appellants. Also represented by MARC A. COHN, JENNIFER SKLENAR.

ROBERT N. HOCHMAN, Sidley Austin LLP, Chicago, IL, argued for defendant-cross-appellant. Also represented by CAROLINE A. WONG; JILLIAN STONECIPHER, Washington, DC; VERA ELSON, Wilson Sonsini Goodrich & Rosati, PC, Palo Alto, CA; OLIVIA M. KIM, EDWARD POPLAWSKI, Los Angeles, CA.

Before STOLL, CLEVENGER, and WALLACH, *Circuit Judges*.

STOLL, *Circuit Judge*.

This case comes to us on remand from the Supreme Court. The Court vacated our judgment affirming the district court's summary judgment of no invalidity for claim 1 of U.S. Patent No. 9,095,348 in favor of Hologic, Inc. and Cytyc Surgical Products, LLC (collectively, "Hologic") based on the doctrine of assignor estoppel. The Supreme Court held that assignor estoppel remains a valid doctrine, but that it comes with limits. The Court remanded for us to consider whether assignor estoppel, as limited, precludes Minerva Surgical, Inc. from challenging the validity of claim 1. Specifically, we must determine whether claim 1 is "materially broader" than the claims assigned to Hologic such that assignor estoppel should not apply.

For the reasons below, we hold that claim 1 is not "materially broader" than the claims assigned to Hologic. Accordingly, Minerva is estopped from challenging the validity of claim 1 of the '348 patent. We therefore affirm the district court's summary judgment that claim 1 is not invalid. We also reinstate our earlier judgment in all other respects.

BACKGROUND

I

The facts igniting the parties' dispute go back nearly thirty years. In 1993, Csaba Truckai (one of the named inventors of the '348 patent) co-founded a company called NovaCept, Inc. Mr. Truckai and his team at NovaCept invented the NovaSure system, an endometrial ablation device used to treat abnormal uterine bleeding (menorrhagia) by destroying targeted cells in the lining of the uterus.

A

On June 23, 1998, Mr. Truckai filed U.S. Patent Application No. 09/103,072, titled "A Moisture Transport System for Contact Electrocoagulation," which included 31 claims of varying breadth. Of particular relevance here, some claims recited a "fluid permeable elastic member" to pass moisture away from the tissue, while one claim—claim 31—did not. *Compare* J.A. 40357 (claim 1) *and* J.A. 40359–60 (claim 16), *with* J.A. 40362 (claim 31).

Mr. Truckai assigned his interest in the '072 application to NovaCept in August 1998. While the '072 application was pending at the U.S. Patent and Trademark Office, Cytyc Corporation acquired NovaCept for $325 million in March 2004. As part of this acquisition, NovaCept assigned its intellectual property rights to Cytyc, including rights to its patents and any continuation, continuation-in-part, or divisional patent applications (which included the '072 application). In the agreement, NovaCept warranted the validity and enforceability of the intellectual property rights it assigned. Relevant here, NovaCept warranted that it had "no present knowledge from which it could reasonably conclude" that the assigned intellectual property rights were invalid or unenforceable. J.A. 36367 ¶ 3.9(e). The '072 application issued as U.S. Patent No. 6,813,520 in November 2004.

Mr. Truckai eventually left NovaCept and, in 2008, founded Minerva, serving as its President, Chief Executive Officer, and a member of its Board of Directors. Mr. Truckai and others at Minerva developed the Endometrial Ablation System (EAS), which received FDA approval in 2015. Minerva began commercial distribution of the EAS in August 2015.

B

Hologic acquired Cytyc in 2007 and is the current assignee of the'348 patent at issue in this litigation. The

'348 patent issued in 2015 and claims priority to the '072 application through a series of continuation and divisional applications.

The '348 patent written description states that the inventors developed an ablation device that eliminates the problem of "steam and liquid buildup at the ablation site," which occurred with prior art ablation devices. '348 patent col. 2 ll. 25–30. According to the written description, moisture buildup in prior art devices "create[d] a path of conductivity through which current traveling through the electrodes" flowed, "prevent[ing] the current from traveling into the tissue to be ablated." *Id.* at col. 2 ll. 9–12. As the written description explains, the current then heated the water drawn from the tissue, "turn[ing] the ablation process into a passive heating method in which the heated liquid around the electrodes cause[d] thermal ablation to continue well beyond the desired ablation depths." *Id.* at col. 2 ll. 15–18. To overcome this moisture problem, the written description explains that the claimed devices can be constructed so "moisture generated during dehydration is actively or passively drawn . . . away from the tissue." *Id.* at col. 2 ll. 40–45.

An exemplary ablation device comprises three major components: (1) an applicator head, (2) a main body, and (3) a handle. *Id.* at col. 4 ll. 55–58. The applicator head "includes an electrode carrying means" with "an array of electrodes" on the surface of the electrode carrying means. *Id.* at col. 4 ll. 58–61. The written description explains that the electrode carrying means "is preferably a sack formed of a material which is non-conductive" and "permeable to moisture and/or . . . has a tendency to absorb moisture." *Id.* at col. 5 ll. 52–57. Enclosed within the electrode array is a deflecting mechanism and its deployment structure. *Id.* at col. 13 ll. 8–12. According to the written description, the deflecting mechanism is "used to expand and tension the [electrode] array for positioning into contact with the tissue," *id.* at col. 12 ll. 5–8, "form[ing] the [electrode] array

into the substantially triangular shape" that "is particularly adaptable to most uterine shapes," *id.* at col. 14 ll. 21–24.

Claim 1 is the only asserted claim of the '348 patent. Because claim 1's relevance relates to whether it is materially broader than claim 31 of the '072 application, we reproduce claim 1 and claim 31 side-by-side in our analysis of that question below. *See infra* p. 14.

II

In November 2015, Hologic sued Minerva in the U.S. District Court for the District of Delaware, alleging that Minerva's EAS and the use thereof infringed certain claims of the '348 patent. Minerva, in response, asserted various invalidity defenses, including lack of enablement and written description. Hologic moved for summary judgment, arguing that the doctrine of assignor estoppel bars Minerva from challenging the validity of the '348 patent claims in district court. The district court agreed, entering summary judgment of no invalidity in Hologic's favor. *See Hologic, Inc. v. Minerva Surgical, Inc.*, 325 F. Supp. 3d 507, 523–25 (D. Del. 2018) (*Hologic I*). It also granted summary judgment of infringement of claim 1 of the '348 patent. *See id.* at 529–32.

After a jury trial on the issues of willful infringement, damages, and certain state-law counterclaims, both parties appealed, raising numerous issues in this court. In its cross-appeal, Minerva challenged (among other things) the district court's determination that assignor estoppel precluded Minerva from challenging the validity of claim 1 of the '348 patent. It also challenged the district court's claim constructions of two terms in claim 1—"applicator head" and "indicator mechanism"—relevant to infringement. We concluded that the district court did not abuse its discretion in applying the doctrine of assignor estoppel and accordingly affirmed its summary judgment of no invalidity. *Hologic, Inc. v. Minerva Surgical, Inc.*, 957 F.3d 1256,

1267–69 (Fed. Cir. 2020) (*Hologic II*). We also adopted the district court's constructions of the terms that Minerva challenged, thus affirming the district court's summary judgment of infringement. *See id.* at 1269–70.

Minerva petitioned the Supreme Court for a writ of certiorari, arguing that the doctrine of assignor estoppel "finds no support in the statute, [the Supreme] Court's decisions, or the policies the Patent Act serves." Pet. for Writ of Cert. at 14, *Minerva Surgical, Inc. v. Hologic, Inc.*, 141 S. Ct. 2298 (2021) (No. 20-440). To Minerva, its case provided "a uniquely valuable opportunity" for the Court to consider "not only whether to abandon the doctrine entirely, but also whether to retain the doctrine with clearly defined, narrow limits." *Id.* at 28–29.

The Supreme Court granted certiorari and declined Minerva's request to "discard this century-old form of estoppel," but in doing so clarified that assignor estoppel "comes with limits." *Minerva Surgical, Inc. v. Hologic, Inc.*, 141 S. Ct. 2298, 2302, 2309 (2021) (*Hologic III*). It explained that the doctrine "reaches only so far as the equitable principle long understood to lie at its core." *Id.* at 2302. The Court thus held that assignor estoppel "applies only when an inventor says one thing (explicitly or implicitly) in assigning a patent and the opposite in litigating against the patent's owner." *Id.* at 2304. Put another way, the Court explained that "there is no ground for applying assignor estoppel" "when the assignor has made neither explicit nor implicit representations in conflict with an invalidity defense." *Id.* at 2310.

The Supreme Court then considered Minerva's contention that "estoppel should not apply because it was challenging a claim that was materially broader than the ones [Mr.] Truckai had assigned," *id.* at 2310, a contention that our precedent had deemed irrelevant, *Hologic II*, 957 F.3d at 1268. The Court disagreed with our conclusion, explaining that Minerva's contention was important to whether

estoppel should apply: "If Hologic's new claim is materially broader than the ones [Mr.] Truckai assigned, then [Mr.] Truckai could not have warranted its validity in making the assignment. And without such a prior inconsistent representation, there is no basis for estoppel." *Hologic III*, 141 S. Ct. at 2311. The Court thus vacated our judgment and remanded for us to address "whether Hologic's new claim is materially broader than the ones [Mr.] Truckai assigned." *Id.*

We therefore reconsider whether the district court abused its discretion in determining that assignor estoppel barred Minerva's invalidity defenses in light of the Supreme Court's guidance.

DISCUSSION

The dispute on remand focuses on whether claim 1 of the '348 patent is materially broader than claim 31 of the '072 application, a claim that was canceled two years before NovaCept assigned its intellectual property rights to Cytyc (Hologic's predecessor).

Minerva argues that every claim pending at the time of the 2004 assignment "included an *express* limitation that the applicator head be moisture permeable." Cross-Appellant's Suppl. Br. 4. Minerva concedes that claim 31 did not have such a limitation but asserts that claim 31 was canceled in 2002, well before the 2004 assignment, and therefore it was not assigned. Minerva thus argues that Hologic cannot assert that Mr. Truckai[1] represented claim 31 was valid at the time of the 2004 assignment. Minerva further argues that even if Hologic can properly rely on claim 31, that claim did not cover a device with a moisture-impermeable applicator head because it did not use the term "applicator head." And it argues that the written description

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[1] We use "NovaCept" and "Mr. Truckai" interchangeably when referencing the 2004 assignment.

makes clear that the term "electrode array," as used in claim 31, requires a moisture-permeable electrode array. Thus, per Minerva, claim 1 of the '348 patent—which covers both moisture-permeable and moisture-impermeable devices—is materially broader than claim 31, which is limited to moisture-permeable devices.

Hologic, for its part, responds first that Mr. Truckai warranted claim 31's validity at the time of the assignment. Hologic acknowledges that claim 31 was canceled prior to the 2004 assignment. It argues, however, that the context in which this cancelation arose matters: the cancelation was "without prejudice" complying with a restriction requirement entered by the Examiner. According to Hologic, under standard patent prosecution practice, the expectation is that a patent practitioner could have re-introduced the canceled claim in a continuation or divisional application. And further, Hologic notes the Examiner allowed claim 31 on the merits prior to cancelation. Continuing, Hologic argues that claim 1 is not materially broader than claim 31 because neither claim has any moisture-permeability limitation.

The questions before us are therefore: (1) whether Mr. Truckai warranted claim 31's validity at the time of assignment, considering the parties' arguments regarding the implications of the 2002 cancelation; and (2) whether claim 31 is materially broader than claim 1 of the '348 patent—specifically, whether claim 31 is broad enough to cover moisture-impermeable devices, or if instead it is limited to moisture-permeable devices. We address each argument in turn.

I

We begin our analysis by considering whether claim 31 was assigned in the 2004 assignment such that Mr. Truckai warranted claim 31's validity as part of that assignment. The answer to this question turns on the

'072 application's prosecution history and what it tells an objective assignee about why claim 31 was canceled.

As noted above, Mr. Truckai and his co-inventors filed the '072 application on June 23, 1998, with 31 claims. J.A. 40293, 40357–62. On June 21, 1999, the Examiner issued an office action rejecting claim 31 as anticipated under 35 U.S.C. § 102. *See* J.A. 40382–84. Mr. Truckai disagreed, arguing in his December 21, 1999 office action response that claim 31 was not anticipated by the prior art of record. J.A. 40398. Mr. Truckai convinced the Examiner, who allowed claim 31 on October 3, 2000 (while maintaining rejections of other pending claims). J.A. 40416.

On May 21, 2001, the Examiner issued a restriction requirement for claim 31 under 35 U.S.C. § 121. Section 121[2] governs divisional applications and provides that where "two or more independent and distinct inventions are claimed in one application, the Director may require the application to be restricted to one of the inventions." In the restriction requirement, the Examiner explained that certain pending claims (including claim 31) were drawn to an apparatus for ablating and that other pending claims were drawn to a method of ablating. J.A. 40442–43. That is, the Examiner concluded that the apparatus claims (including claim 31) were distinct inventions from the method claims. The Examiner thus required Mr. Truckai to elect which claims he wanted to further prosecute in the '072 application. *See* 37 C.F.R. § 1.142(a) ("If two or more independent and distinct inventions are claimed in a single application, the examiner in an Office action will require the applicant

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[2] Congress amended § 121 when it enacted the Leahy–Smith America Invents Act (AIA). Pub. L. No. 112–29, § 4(a)(2), 125 Stat. 284, 295 (2011). We use the version of § 121 that was in effect at the time of the May 21, 2001 office action.

in the reply to that action to elect an invention to which the claims will be restricted . . . .").

On June 5, 2001, Mr. Truckai requested that the Examiner withdraw the restriction requirement because the Examiner had already allowed claim 31. In the alternative, he elected the method claims for further prosecution on the merits. The Examiner maintained the restriction requirement and noted Mr. Truckai's election of the method claims for further prosecution. In response, on February 28, 2002, Mr. Truckai requested that the Examiner cancel the apparatus claims (including claim 31) "without prejudice." J.A. 40453.

Looking at the prosecution history as a whole, we agree with Hologic that this 2002 cancelation in response to the Examiner's restriction requirement says nothing, implicitly or explicitly, about the patentability of claim 31. Put another way, Mr. Truckai canceled claim 31 for reasons other than patentability. Indeed, an assignee would have understood that the restriction requirement and subsequent cancelation in response to the restriction requirement meant that the patent applicant could later prosecute claim 31's subject matter. This is because non-elected claims are "withdrawn from further consideration by the examiner," 37 C.F.R. § 1.142(b), and there is no final patentability determination for those withdrawn claims (even if the restriction requirement comes after an office action on the merits), *see id.* § 1.142(a); *see also* Manual of Patent Examining Procedure (MPEP) § 810 (explaining that a restriction requirement is distinct from an office action on the merits). Rather, an applicant who has canceled a claim in response to a restriction requirement can file a divisional application with the non-elected claims and proceed separately with prosecution on the merits of those claims. *See* 35 U.S.C. § 121 (explaining that "the other invention [can be] made the subject of a divisional application"); MPEP § 201.06 ("A divisional application is often filed as a result of a restriction requirement made by the examiner."). A

claim canceled in response to a restriction requirement thus travels with the application.

Accordingly, we disagree with Minerva's suggestion that claim 31, once canceled, could not be assigned, and that cancelation of claim 31 was some sort of concession that the claim was unpatentable. Although claim 31 was canceled for purposes of further prosecution of the '072 application, cancelation did not nullify the claim, as it remained viable for further prosecution in a divisional application filed by whomsoever owned the '072 application. A claim canceled in response to a restriction requirement is no less a viable claim just because of its cancelation in response to a restriction requirement. The 2004 assignment assigned not just the rights to the '072 application, but also the rights to any continuation, continuation-in-part, or divisional patent applications not yet filed. For certain, canceled claim 31 traveled with the '072 application and its assignment to Hologic. Mr. Truckai signed an oath when presenting the '072 application, in which he stated his implicit good-faith belief that the claims in the application are patentable and would result in a valid patent. *See Hologic III*, 141 S. Ct. at 2309 n.3. The representations in that oath were further reaffirmed twice: First, by Mr. Truckai successfully defending claim 31 from the Examiner's anticipation rejection before its cancelation, and second, by the 2004 assignment, in which the assignor warranted that it had "no present knowledge from which it could reasonably conclude" that these assigned intellectual property rights were invalid or unenforceable. J.A. 36367 ¶ 3.9(e). Therefore, Mr. Truckai represented (whether implicitly or explicitly) that the subject matter of claim 31 was not invalid.[3]

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[3] Our holding in this regard is limited to the facts of this case. We do not address whether a claim canceled for

II

Having determined that the 2004 assignment included a warranty as to claim 31's validity, we turn now to the question of whether claim 1 of the '348 patent is "materially broader" than claim 31 of the '072 application. This requires us to construe the assigned and issued claims and compare the properly construed claims, focusing on the material aspects of those claims. Because this determination rests on principles of claim construction, it is ultimately a question of law we review de novo where, as here, it is decided only on the intrinsic evidence. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015).

The parties have significantly narrowed the question before us on remand, agreeing on which assigned and new claims to compare and also agreeing on what would make the new claim "materially broader" than the assigned claim. Specifically, the parties agree: (1) that we need only compare claim 1 of the '348 patent to claim 31 of the '072 application (the parties did not identify any other assigned claims relevant to this question); and (2) that whether claim 1 is "materially broader" (rather than just broader) than claim 31 depends on the difference between moisture-permeable and moisture-impermeable devices.[4] We previously held that claim 1 broadly covers moisture-impermeable devices. *See Hologic II*, 957 F.3d at 1269–70 (adopting district court's construction of "applicator head" and rejecting Minerva's construction requiring the claimed applicator head be moisture permeable); Cross-Appellant's Suppl. Br. 3 (conceding that claim 1 has been construed "to cover devices with moisture impermeable applicator

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reasons other than to comply with a restriction requirement would be part of the 2004 assignment.

[4] Given this agreement, we need not in this case define the line between broader claims and materially broader claims.

heads"). Thus, if claim 31 is limited to moisture-permeable devices, the parties agree that claim 1 is "materially broader" and assignor estoppel would not bar Minerva from asserting its invalidity defenses. Claims 1 and 31 are reproduced in relevant part below:

'348 patent claim 1	*'072 application claim 31*
1. A device for treating a uterus comprising: an elongate member having a proximal portion and a distal portion, the elongate member comprising an outer sleeve and an inner sleeve slidably and coaxially disposed within the outer sleeve; an applicator head coupled to the distal portion, the applicator head defining an interior volume and having a contracted state and an expanded state, the contracted state being configured for transcervical insertion and the expanded state being configured to conform to the shape of the uterus, the applicator head including one or more electrodes for ablating endometrial lining tissue of the uterus; . . .	31. An ablation and/or coagulation apparatus for use in delivering energy to tissue for ablation, the apparatus comprising: an elongate member; a deployment mechanism carried by the elongate member, the deployment mechanism moveable between a retracted position and a plurality of laterally expanded positions; *an electrode array* carried by the deployment mechanism; a sheath slidably disposed over the electrode array; . . .

'348 patent col. 19 ll. 9–42; J.A. 40362 (emphasis added to disputed limitation).

At the outset, Minerva and Hologic agree that claim 31 does not have an express moisture-permeability limitation. Cross-Appellant's Suppl. Br. 4; Appellants' Suppl. Resp. Br. 2. Thus, there is no dispute that the plain claim language—the starting point of any claim construction analysis, *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005)—suggests that claim 31 is not limited to moisture-permeable devices. Rather, the plain claim language is broad enough to encompass moisture-impermeable devices as well.

Minerva nevertheless argues that claim 31 cannot cover a moisture-impermeable device. First, Minerva focuses on the lack of an "applicator head" limitation in claim 31, arguing that the claim therefore does "not cover a device with a moisture impermeable applicator head." Cross-Appellant's Suppl. Br. 6. We disagree. Claim 31 is an open-ended "comprising" claim. That claim 31 does not have an applicator head limitation supports the opposite conclusion: that the claim broadly covers both moisture-permeable and -impermeable applicator heads.

Second, Minerva argues that the term "'electrode array' requires a material that is moisture permeable"—i.e., the claimed ablation device is moisture-permeable because it has a moisture-permeable electrode array. Cross-Appellant's Suppl. Br. 8. We disagree, as nothing in the intrinsic record supports limiting claim 31 in the way Minerva urges. In fact, the principle of claim differentiation supports the opposite conclusion. Claim 1 of the '072 application, for example, recited "an ablation device including an electrode array," with "the electrode array including a fluid permeable elastic member." J.A. 40357. It also recited "permitting moisture generated during the dehydration . . . to pass into the electrode carrying member." *Id.* In other words, it expressly recited moisture permeability. Claim 16 likewise recited a fluid-permeable electrode array. *See* J.A. 40359–60 ("an electrode array carried by an elongate member, the array including a fluid permeable

elastic member"). This shows that Mr. Truckai and the other inventors knew how to draft claims that require moisture permeability. The fact that they chose not to include this limitation in claim 31, unlike claims 1 and 16, indicates that they did not intend to so limit that claim. *See Phillips*, 415 F.3d at 1314 ("Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.").

Minerva also emphasizes the written description's disclosure of an embodiment that has "an array of electrodes formed on the surface of [an] electrode carrying means" that is "permeable to moisture," arguing that claim 31 is therefore limited to a moisture-permeable device. Cross-Appellant's Suppl. Br. 7 (quoting '348 patent[5] col. 4 ll. 58–61, col. 5 ll. 52–61). To be sure, the cited portion of the written description does reference a moisture-permeable electrode array. But this description of the "electrode carrying means" refers merely to "preferabl[e]" characteristics, including permeability "and/or a tendency to absorb moisture." '348 patent col. 5 ll. 52–61. It is not described as a required or mandatory characteristic. Accordingly, it is improper to restrict claim 31 to this "preferable" characteristic. *See Comaper Corp. v. Antec, Inc.*, 596 F.3d 1343, 1348 (Fed. Cir. 2010) (explaining that we do not "limit[] claims to a preferred embodiment"); *InterDigital Commc'ns, LLC v. Int'l Trade Comm'n*, 690 F.3d 1318, 1328 (Fed. Cir. 2012) ("Because we conclude that the claim language is broad enough to include both embodiments, the inventors' failure to include a reference to the alternative

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[5] Neither party has cited or relied on the '072 application's written description as filed, nor have they identified any material differences between the '072 application's and '348 patent's written description. For simplicity, we, like the parties, rely on the '348 patent's written description in construing claim 31.

embodiment in the specification does not justify excluding that embodiment from the coverage of the claims.").

We acknowledge here, as we did in *Hologic II*, that the written description "emphasizes the importance of moisture removal," 957 F.3d at 1269, as reflected in Minerva's citations to descriptions of moisture removal and permeability in the '348 patent written description, Cross-Appellant's Suppl. Br. 7–8. After considering the intrinsic record as a whole, however, we disagree with Minerva's assertion that claim 31 is limited to a moisture-permeable device. Accordingly, we hold that claim 1 of the '348 patent is not materially broader than claim 31 of the '072 application.

* * *

As we explained in *Hologic II*, "Minerva disputed none of the pertinent facts" concerning assignor estoppel at the district court or on appeal, including: (1) that Mr. Truckai executed a broad assignment of his patent rights to NovaCept and later sold NovaCept to Hologic's predecessor; (2) that NovaCept received appreciable value for those patent rights; (3) that Mr. Truckai founded Minerva and used his expertise to research, develop, and obtain FDA approval for Minerva's EAS; (4) that his job responsibilities included bringing the EAS to market to compete with Hologic; and (5) that he is in privity with Minerva. 957 F.3d at 1268. Thus, in view of our determination that claim 1 of the '348 patent is not materially broader than claim 31 of the '072 application, we conclude that the district court did not abuse its discretion in applying the doctrine of assignor estoppel. We thus affirm the district court's summary judgment of no invalidity as to claim 1 of the '348 patent.

CONCLUSION

We have considered Minerva's remaining arguments and find them unpersuasive. For the foregoing reasons, we hold that Minerva is estopped from challenging the validity of the '348 patent claims based on the doctrine of assignor

estoppel. We therefore affirm the district court's summary judgment that claim 1 of the '348 patent is not invalid.

Many portions of our earlier judgment were unaffected by the Supreme Court's vacate and remand. We therefore reinstate our earlier judgment (1) affirming the district court's denial of Hologic's motions for a permanent injunction, enhanced damages, and ongoing royalties for infringement of the asserted claims of U.S. Patent No. 6,827,183; (2) affirming the district court's summary judgment of infringement of claim 1 of the '348 patent; (3) affirming the district court's denial of Hologic's requests for supplemental damages and for increased and enhanced supplemental damages; and (4) vacating the district court's award of pre-and post-judgment interest on the supplemental-damages award and remanding with instructions to calculate the interest award in accordance with *Hologic II*.

AFFIRMED-IN-PART, VACATED-IN-PART, AND REMANDED

COSTS

No costs.