NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

CARDIAQ VALVE TECHNOLOGIES, INC.,
Plaintiff-Cross-Appellant

v.

NEOVASC INC., NEOVASC TIARA INC.,
Defendants-Appellants

2017-1302, 2017-1513

Appeals from the United States District Court for the District of Massachusetts in No. 1:14-cv-12405-ADB, Judge Allison Dale Burroughs.

Decided: September 1, 2017

JOHN B. SGANGA, JR., Knobbe, Martens, Olson & Bear, LLP, Irvine, CA, argued for plaintiff-cross appellant. Also represented by CHRISTY G. LEA, JOSHUA STOWELL; BRIAN CHRISTOPHER HORNE, Los Angeles, CA.

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FLYNN, CHARLES TAIT GRAVES, Wilson, Sonsini, Goodrich & Rosati, PC, San Francisco, CA; JOEL CHRISTIAN BOEHM, Austin, TX.

Before NEWMAN, O'MALLEY, and TARANTO, *Circuit Judges.*

TARANTO, *Circuit Judge.*

This is an action brought by CardiAQ Valve Technologies, Inc. against Neovasc Inc. and Neovasc Tiara Inc. (jointly, Neovasc). Founded by cardiac surgeon Dr. Arshad Quadri, and soon joined by engineer Brent Ratz, CardiAQ set out to create a mitral-valve implant that could be delivered to the heart by catheter rather than open-heart surgery—a transcatheter mitral valve implant (TMVI). After developing several prototypes, CardiAQ engaged Neovasc to help with assembly of an aspect of the device. The joint work ended after about one year, but during that year, Neovasc secretly launched its own TMVI project. Neovasc eventually secured a patent on its TMVI, U.S. Patent No. 8,579,964, without naming anyone from CardiAQ as co-inventors. Both firms are today continuing their efforts to develop, test, and secure permission to market their TMVIs.

In this action, brought in the District of Massachusetts, CardiAQ alleged, as most relevant for purposes of this appeal, that Neovasc had misappropriated several of CardiAQ's trade secrets and that Dr. Quadri and Mr. Ratz should be added as co-inventors on Neovasc's patent. At trial, CardiAQ grouped its allegedly misappropriated trade secrets into six categories. The jury found misappropriation by Neovasc as to three of them, and it awarded $70 million in damages to CardiAQ, which the district court later enhanced by 30%, to $91 million. *CardiAQ Valve Techs., Inc. v. Neovasc Inc.*, No. 14-cv-12405-ADB, 2016 WL 6465411, at *3, *5–7 (D. Mass. Oct. 31, 2016).

The district court held that CardiAQ had also shown by clear and convincing evidence that its employees were entitled to be named as co-inventors on the '964 patent. *Id.* at *15–19. The court denied CardiAQ's motion for injunctive relief in part; specifically, it refused to require Neovasc to suspend its TMVI project for eighteen months. *Id.* at *7–10. On Neovasc's appeal as to inventorship, misappropriation, and damages, and CardiAQ's cross-appeal as to the denied injunctive relief, we agree with the district court's well-reasoned decisions and affirm.

I

CardiAQ was formed in 2006 by Dr. Quadri and Mr. Ratz with the goal of developing a prosthetic mitral heart valve that could be implanted via a catheter entering the body through a small incision in the patient's leg, making open-heart surgery unnecessary. The TMVI device consists of a metal frame to which valve leaflets made from animal tissue are sewn. In June 2009, Neovasc contacted CardiAQ to advertise its pericardial tissue products and services. Shortly thereafter, CardiAQ engaged Neovasc to provide the tissue leaflets and sew them to CardiAQ's experimental frames. Both parties signed a non-disclosure agreement.

Neovasc supplied CardiAQ with animal tissue leaflets until April 2010. During the time the firms worked together, CardiAQ disclosed detailed information about at least three of its prototypes, called Rev. C, Rev. D, and Rev. E, to Mr. Randy Lane, the principal Neovasc employee in the collaboration. In October 2009, after receiving confidential information from CardiAQ, Mr. Lane started developing a TMVI for Neovasc. The Chief Executive Officer of Neovasc decided that Neovasc should not tell CardiAQ it had begun work on a competing design, and Neovasc kept its project secret from CardiAQ while they worked together. Mr. Lane continued to work on both projects simultaneously.

In May 2009, shortly after the collaboration ended, Neovasc filed a provisional patent application that ultimately issued as the '964 patent, which describes and claims a TMVI with many of the same features as CardiAQ's design. Neovasc plans to market its device under the brand name "Tiara."[1] CardiAQ discovered that Neovasc was developing its own device in December 2011, when Neovasc's patent application was published. The '964 patent issued in November 2013. CardiAQ brought this suit against Neovasc in June 2014, seeking correction of inventorship under 35 U.S.C. § 256 and damages and injunctive relief for, among other things, misappropriation of trade secrets and breach of the non-disclosure agreement.

Following a trial, the jury found that Neovasc had breached the non-disclosure agreement but did not award any damages for that breach. It found that Neovasc had misappropriated trade secrets described in three of the six categories defined in the jury instructions (Trade Secrets 4–6) and awarded CardiAQ $70 million in damages for the misappropriation. When Neovasc moved for a new trial as to liability and damages (it did not seek judgment as a matter of law), the district court denied the motions. *CardiAQ*, 2016 WL 6465411, at *10–14. The court also ordered Mr. Quadri and Mr. Ratz to be added to the '964 patent as co-inventors, *id.* at *15–19; enhanced CardiAQ's trade-secrets damages award by $21 million, *id.* at *5–7; and denied CardiAQ's request to enjoin Neovasc from working on Tiara for eighteen months, *id.* at *7–9. The district court later calculated and awarded pre-judgment and post-judgment interest. *CardiAQ*, No. 14-cv-12405-ADB, 2017 WL 215961, at *1–3 (D. Mass. Jan. 18, 2017).

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[1] Tiara and CardiAQ's device are currently in clinical trials, as are at least two other transcatheter mitral prostheses.

Neovasc appeals from the final judgment and post-trial rulings. Specifically, it challenges the co-inventorship ruling and the district court's refusal to grant a new trial on the misappropriation of Trade Secrets 4–6 and the damages found by the jury. CardiAQ cross-appeals the denial of an injunction requiring Neovasc to suspend its TMVI program for eighteen months.

Because the inventorship claim under 35 U.S.C. § 256 "aris[es] under . . . [an] Act of Congress relating to patents," we have jurisdiction over this appeal, including the pendent state-law claims. 28 U.S.C. § 1295(a)(1); *see BBA Nonwovens Simpsonville, Inc. v. Superior Nonwovens, LLC*, 303 F.3d 1332, 1336 (Fed. Cir. 2002).

II

A

The overall determination of co-inventorship is a legal one that we review de novo, but it is based on factual findings reviewed for clear error when, as in this case, made by the district court. *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1362–63 (Fed. Cir. 2004); *Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998). To prevail under 35 U.S.C. § 256, the plaintiff must show, by clear and convincing evidence, that the unnamed but alleged co-inventor made a contribution to the conception of at least one claim of the patent "that is not insignificant in quality, when that contribution is measured against the dimension of the full invention." *Acromed Corp. v. Sofamor Danek Grp., Inc.*, 253 F.3d 1371, 1379 (Fed. Cir. 2001) (quoting *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1351 (Fed. Cir. 1998)). It is not enough under that standard if the alleged co-inventor "merely explain[ed] to the real inventors well-known concepts and/or the current state of the art." *Id.* (quoting *Pannu*, 155 F.3d at 1351); *see Ethicon*, 135 F.3d at 1460. Here, the parties have not differentiated Dr. Quadri from Mr. Ratz in the co-inventorship dispute, and they have fo-

cused on claim 1, the only independent claim of Neovasc's patent.

The jury in this case, having been asked to make an advisory factual determination, found that Dr. Quadri and Mr. Ratz contributed to the conception of the '964 patent. The district court then made its own factual findings and co-inventorship determinations and ordered that the two CardiAQ researchers be added to the patent as co-inventors. *CardiAQ*, 2016 WL 6465411, at *18–19. The court found in particular that Mr. Lane, of Neovasc, "had never designed a TMVI device prior to working on the CardiAQ device"; CardiAQ had shared with Neovasc "the designs, prototypes, and development history of its device"; and the "progression of TMVI ideas sketched in Mr. Lane's notebook reflect[ed] a trend towards the designs of CardiAQ." *Id.* at *18. In nevertheless denying co-inventorship, Neovasc argued that it alone conceived of what it insisted is the only novel element of its claim 1—namely, "anchoring the first trigonal anchoring tab against a first fibrous trigone on a first side of an anterior leaflet of the native mitral valve." '964 patent, col. 28, lines 31–33. In response, the district court determined that "even if Neovasc independently conceived of trigonal anchoring tabs designed to anchor on the fibrous trigone, CardiAQ still made a significant contribution to the conception of the '964 Patent." *CardiAQ*, 2016 WL 6465411, at *18. Specifically, the district court found that Mr. Ratz and Dr. Quadri had shown Mr. Lane the following:

> [A] device that is delivered to a patient's heart via a catheter, either through the apex of the heart or through the femoral vein; that once positioned in the patient's native mitral valve, is allowed to expand and engages the native anatomy on both the atrial and ventricular sides of the annulus and includes an anterior side and a posterior side; and whose anchors extend between the native chordae

> tendinae, behind the free edge of the native mitral valve leaflets, and engage onto the native mitral annulus.

Id.[2]

On appeal, Neovasc again contends that those contributions cannot entitle Dr. Quadri and Mr. Ratz to co-inventor status because they were present in the prior art. Neovasc faults the district court on two grounds. We find neither persuasive.

Neovasc's main argument relies on a patent application for what later issued as U.S. Patent No. 8,449,599 to Chau, which it contends qualified as prior art to the '964 patent, even though it was secret at the time of the collaboration, under now-repealed 35 U.S.C. § 102(e) (2006). The district court rejected Neovasc's reliance on Chau as a ground for rejecting co-inventorship. It concluded that the then-secret Chau reference did "not detract from CardiAQ's contribution to the '964 Patent" because the CardiAQ employees were "not 'merely explain[ing] . . . well-known concepts and/or the current state of the art,'" but were sharing "in far more detail than they had ever made public . . . the inventive process behind their TMVI project" at a time when "no one had ever built a successful transcatheter mitral valve device." *CardiAQ*, 2016 WL 6465411, at *19 (some alterations in original) (quoting *Pannu*, 155 F.3d at 1351).

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[2] CardiAQ also submitted evidence that one prototype disclosed to Neovasc was designed in such a way that it would necessarily anchor on the fibrous trigone. The district court did not rely on that evidence. *See CardiAQ*, 2016 WL 6465411, at *16–17. We need not consider such evidence, because we find no reversible error in the district court's basis of decision.

Neovasc has not shown error in the district court's conclusion. Although we have stated that "[a] contribution of information in the prior art cannot give rise to joint inventorship because it is not a contribution to conception," *Eli Lilly*, 376 F.3d at 1362, Neovasc has not pointed to any invocation of that proposition in a case involving secret, § 102(e) art. Thus, stated in the context of public prior art, the proposition just restates a fundamental principle we have repeated about co-inventorship: the mere contribution of public knowledge available to a person of ordinary skill, which could readily have been acquired by the named inventor independently, does not make one a co-inventor.[3] It is that principle which gov-

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[3] *See Natron Corp. v. Schukra U.S.A., Inc.*, 558 F.3d 1352, 1357 (Fed. Cir. 2009) ("[T]he contribution of the extender is insignificant when measured against the full dimension of the invention of claim 11, not just because it was in the prior art, but because it was part of existing automobile seats, and therefore including it as part of the claimed invention was *merely the basic exercise of ordinary skill in the art*." (emphasis added)); *Caterpillar Inc. v. Sturman Indus., Inc.*, 387 F.3d 1358, 1377 (Fed. Cir. 2004) ("[A] person will not be a co-inventor if he or she does no more than explain to the real inventors concepts that are *well known* [in] the current state of the art." (second alteration in original) (emphasis added) (quoting *Fina Oil & Chem. Co. v. Ewen*, 123 F.3d 1466, 1473 (Fed. Cir. 1997)); *Ethicon*, 135 F.3d at 1460 ("One who simply provides the inventor with *well-known principles* or explains the state of the art without ever having 'a firm and definite idea' of the claimed combination as a whole does not qualify as a joint inventor." (emphasis added)); *Pannu*, 155 F.3d at 1351 (holding someone an inventor, even though he had publicly disclosed his contribution more than a year prior to the collaboration, because he was "doing more than simply providing [a co-inventor]

erns. Neovasc has cited no case in which we have barred co-inventorship, as a matter of law, just because the contribution later appeared in the public domain, where the ideas contributed were not contemporaneously available to an ordinary skilled artisan and were otherwise significant in producing the inventive conception at the time it was completed. We have been presented no sound reason for adopting such a legal bar now.

Here, the presence of the CardiAQ-contributed features in then-secret prior art does not, as a matter of law, automatically disqualify the CardiAQ employees as inventors. Neovasc does not offer reasons why, as a matter of fact, the district court erred in finding that CardiAQ's employees contributed to conception. Neovasc does not argue that the CardiAQ's contributions were insignificant when measured against the invention as a whole. We therefore reject Neovasc's argument that Chau requires reversal of the co-inventorship ruling.

Neovasc's second challenge to the co-inventorship ruling is that the district court erred in not addressing the Solem reference, U.S. Patent App. Pub. No. 2006/0241745 (pub'd Oct. 26, 2006), which it alleges discloses all the elements of CardiAQ's alleged contributions. Given that

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with *well-known principles* or explaining the state of the art; he was contributing his ideas concerning the snag-resistant elements to a total inventive concept." (emphasis added)); *Hess v. Advanced Cardiovascular Sys., Inc.*, 106 F.3d 976, 981 (Fed. Cir. 1997) (no co-inventorship when putative co-inventor was "doing nothing more than explaining to the inventors what the then state of the art was," where "most, if not all, of his discussion with them [was] telling them what was available in the marketplace by way of product," and "[t]he principles [he] explained . . . were *well known and found in textbooks*." (emphasis added)).

Neovasc asserts that its only inventive contribution was deliberate trigonal anchoring, its argument requires it, at a minimum, to have shown that the other elements of the claim were not only present but combined in Solem: Neovasc does not dispute that they were combined in CardiAQ's disclosures to Neovasc or that the combination of individually known elements can be patentable. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–19 (2007) (noting that inventions may be composed entirely of elements present in the prior art, the combination being the patentable invention); *Veritas Techs. LLC v. Veeam Software Corp.*, 835 F.3d 1406, 1414–15 (Fed. Cir. 2016).

Neovasc did not adequately present an argument about Solem along those lines to the district court, and so the district court cannot be faulted for not addressing Solem. Neovasc only briefly mentioned Solem in its brief to the district court on CardiAQ's inventorship claim, Defendant Neovasc Inc.'s and Neovasc Tiara Inc.'s Brief Regarding CardiAQ's Claim for Inventorship Under 35 U.S.C. § 256 at 21, 25, *CardiAQ*, No. 1:14-cv-12405-ADB (D. Mass. July 29, 2016), ECF No. 535, at the oral argument on the inventorship claim, Motion Hearing Transcript at 76:20–77:1, *CardiAQ*, No. 1:14-cv-12405-ADB (D. Mass. Aug. 25, 2016), ECF No. 559, and at the trial, J.A. 21889–90. At most, Neovasc argued that Solem disclosed a particular anchoring mechanism—anchoring behind the leaflets to engage the mitral annulus. Neovasc did not argue that Solem disclosed *all* the elements allegedly contributed by CardiAQ, including a device with an atrial skirt, a ventricular skirt, and a plurality of valve leaflets, much less in combination. Having found that CardiAQ contributed the combination of those features, the district court was not obliged to address Neovasc's undeveloped

argument that another reference disclosed one of those features.[4]

B

When the jury was given CardiAQ's claim of trade-secret misappropriation, the parties agreed on a formulation of the allegedly misappropriated trade secrets as a list of six items (Trade Secrets 1–6)—a list on which some of the individual items indisputably covered alternative possibilities, *i.e.*, actually covered groups of possible secrets. Neovasc did not object to that listing, or to the precise definitions given to the jury of each item, or to the verdict form that asked the jury to decide on misappropriation simply as to each of the six items, without further refinement. The jury found no misappropriation of Trade Secrets 1–3, which covered CardiAQ's Rev. C, Rev. D, and Rev. E prototypes respectively. It found misappropriation of Trade Secrets 4–6.

Neovasc did not move for judgment as a matter of law on CardiAQ's claims for misappropriation of Trade Secrets 4–6; it sought only a new trial on the ground that the jury's verdict was "contrary to law and against the great weight of the evidence." J.A. 4413. The district court denied the motion. *CardiAQ*, 2016 WL 6465411, at *12–14. We review the denial of the motion for a new trial for abuse of discretion. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269, 1277 (Fed. Cir. 2011); *Whitfield v. Melendez-Rivera*, 431 F.3d 1, 9 (1st Cir. 2005). We can reverse the district court's denial "only if 'the verdict is so seriously mistaken,

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[4] In a footnote, Neovasc points to two other references that it argues disclose every allegedly CardiAQ-contributed element. Appellants' Br. 28 n.3. That argument is forfeited. *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1320 (Fed. Cir. 2006).

so clearly against the law or the evidence, as to constitute a miscarriage of justice.'" *Astro-Med, Inc. v. Nihon Kohden Am., Inc.*, 591 F.3d 1, 13 (1st Cir. 2009) (quoting *Levesque v. Anchor Motor Freight, Inc.*, 832 F.2d 702, 703 (1st Cir. 1987)).

1

Based on Exhibit 1157, which the parties agreed should be presented to the jury as the statement of the alleged trade secrets, the district court summarized Trade Secret 4 as follows:

> A transcatheter replacement mitral valve prosthesis design that includes an expandable metal frame for supporting a tricuspid, one-way valve, the expandable metal frame sized for placement in a human native mitral valve space, where the prosthesis is configured for mitral valve implantation without relying exclusively on radial force but rather by engaging the native mitral valve annulus on the atrial side of the native mitral valve and by anchoring the prosthesis on the ventricular side of the native mitral valve annulus, where the prosthesis includes one or more of the following additional features: a. Ventricular Anchors that Extend Between the Chordae, Capture the Native Leaflets, and Engage the Ventricular Side of the Native Mitral Annulus . . . b. Variable Strut Dimensions . . . c. Lower Atrial Profile . . . d. Larger Ventricular Cross-Sectional Dimension . . . e. V-Shaped Atraumatic Anchors . . . f. Mushroom-Shaped Locking Tabs[.]

CardiAQ, 2016 WL 6465411, at *12. Neovasc makes three arguments as to why it deserves a new trial on Trade Secret 4. We reject the arguments.

First, Neovasc contends that the description of Trade Secret 4—in the above summary, or in the lengthier

Exhibit 1157 recitation given to the jury—is insufficiently specific to identify a protectable trade secret. The district court noted that "Neovasc waited until after trial to argue that CardiAQ's disclosures were somehow inadequate," *CardiAQ*, 2016 WL 6465411, at *13 n.6, and CardiAQ points out that not only did Neovasc not object to the district court's instruction to the jury that Exhibit 1157 described CardiAQ's trade secrets, Neovasc itself requested that Exhibit 1157 be so used, *see* Fed. R. Civ. P. 51; *Putnam Res. v. Pateman*, 958 F.2d 448, 456–57 (1st Cir. 1992) (explaining that failure to object to jury instructions typically precludes future challenges to those instructions and "a party cannot be permitted to complain about invited errors"). Nevertheless, the district court concluded that "CardiAQ identified trade secret 4 with sufficient detail, describing its TMVI design with particularity." *CardiAQ*, 2016 WL 6465411, at *13 n.6. We agree.

Trade Secret 4 is not merely a collection of features—it is a collection of devices, each of which must contain what is described in the first half of the trade secret, together with one or more of the six listed additional features. That Trade Secret 4 may describe 63 (*i.e.*, $2^6 - 1$) separate devices does not mean that there is a lack of specificity. Each of the 63 devices is specific. Indeed, Neovasc does not even argue that any of the six features, or the possible combinations one or more of them with the common device features, is insufficiently specified.[5]

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[5] Neovasc identifies no specificity problem with any of the six features at issue here akin to the problems with the trade secrets judged to be too vague in the cases Neovasc cites. *Sutra, Inc. v. Ice. Express, EHF*, No. 04-11360-DPW, 2008 WL 2705580, at *4 (D. Mass. July 10, 2008) (criticizing the specificity of "'the operation, appearance, features and functionality of the Control Agent and Reservation Control interfaces and modules' of [plaintiff's]

CardiAQ could have listed each of the 63 devices separately for the jury; Trade Secret 4 just simplified the presentation to the jury. That grouping, to which Neovasc agreed, introduced no specificity problem.

Neovasc also argues that the combination of known elements cannot be a protectable trade secret, Appellants' Br. 32 (citing *Strategic Directions Grp., Inc. v. Bristol-Meyers Squibb Co.*, 293 F.3d 1062 (8th Cir. 2002) (holding that a subset of a publicly available collection of market research questions is not secret)). But *Strategic Directions*, interpreting Minnesota law, stands for no such broad proposition. Indeed, it acknowledged that some combinations of known elements can be secret and found only that the plaintiff had not shown anything secret about the combination of public survey questions at issue. *Strategic Directions*, 293 F.3d at 1065. Neovasc did not object to this jury instruction:

> A trade secret can exist in a combination of characteristics and components, even if some or all of the characteristics and components are in the public domain, as long as the unified process, design, and operation of the combination constitutes a unique combination that is a trade secret.

AirKiosk System"); *Staffbridge, Inc. v. Gary D. Nelson Assocs., Inc.*, No. 02-4912-BLS, 2004 WL 1429935, at *1–4 (Mass. Super. Ct. June 11, 2004) (ordering plaintiffs to identify what in their entire program's source code was being claimed as a trade secret); *Jostens, Inc. v. Nat'l Comput. Sys., Inc.*, 318 N.W.2d 691, 697 (Minn. 1982) ("It is not always easy to follow Jostens' contentions because its claim of a trade secret is rather elastic. At times, the claim appears to include the entire CAD/CAM system; at other times, something less.").

J.A. 22393. And Neovasc shows no error in the district court's finding that the combination of these features was not well-known in the mitral valve industry, as there had never been a successful mitral valve before. *CardiAQ*, 2016 WL 6465411, at *9, *13. Neovasc's expert admitted that the full combination of features identified in Trade Secret 4 was not disclosed anywhere in the prior art. J.A. 22020–21. Thus, we agree with the district court that "the jury could reasonably find that a TMVI device containing" even some known features was a protectable trade secret. *CardiAQ*, 2016 WL 6465411, at *13.

Finally, Neovasc argues that Trade Secret 4 is not a "unified process or device" and so is not protectable under Massachusetts trade-secret law. Appellants' Br. 30; *see* J.A. 22393 (instruction speaking of a "unified process, design, and operation"). But Neovasc did not ask for any further clarification of what is required to be a "unified process." And it has not identified any such Massachusetts-law requirement that makes the jury's determination here improper or that precludes a finding of a "unified process" in this case. It cites *Peggy Lawton Kitchens, Inc. v. Hogan*, 466 N.E.2d 138 (Mass. App. Ct. 1984), for the proposition that "Peggy Lawton Kitchens did not have a trade secret in all chocolate chip cookies or in all cookies that used one or more enumerated ingredients," but only "its unique, holistic process that produces a distinctive cookie." Appellants' Br. 39. But that case held that a particular ingredient (nut flour) *can* be protected if its addition to cookies is original. *Peggy Lawton Kitchens*, 466 N.E.2d at 140. And it does not preclude a determination, in this quite different context, that each of the devices covered by Trade Secret 4—each one a mitral valve implant—is anything but a "unified" device. We therefore agree with the district court that "the jury could reasonably conclude that" Trade Secret 4 "was both a secret and a unified process." *CardiAQ*, 2016 WL 6465411, at *13.

2

The district court summarized Trade Secret 5 as "the CardiAQ Mandrel, a tool created by CardiAQ to help construct its TMVI device." *Id.* at *14. Neovasc argues that CardiAQ can have no protection for the mandrel because it disclosed the mandrel in a published patent application before Neovasc used the device. Appellants' Br. 39–40; *see On-Line Techs., Inc. v. Bodenseewerk Perkin-Elmer GMBH*, 386 F.3d 1133, 1141 (Fed. Cir. 2004) ("After a patent has issued, the information contained within it is ordinarily regarded as public and not subject to protection as a trade secret."). In denying Neovasc's motion for a new trial, the district court observed that "[t]he patent application . . . did not provide as much information as Neovasc received by holding the physical Mandrel and by viewing CAD [computer aided design] files for the Mandrel that were not included in any patent applications." *CardiAQ*, 2016 WL 6465411, at *14.

We agree with the district court. It is clear from the confidential materials included in the description of Trade Secret 5 that it includes precise dimensions, manufacturing details, and materials. The patent does not disclose this information. Neovasc admitted that its employee used the physical mandrel, with its evident dimensions and materials, for the benefit of another customer. Therefore, it was not an abuse of discretion for the trial court to deny Neovasc's motion for a new trial with respect to Trade Secret 5.

3

The district court summarized Trade Secret 6 as follows:

> The development history of CardiAQ's transcatheter replacement mitral valve prosthesis design, including the following: CardiAQ created an aortic valve prosthesis prototype designated as Rev. 4,

> which CardiAQ evaluated and tested. CardiAQ created a mitral valve prosthesis design designated as Rev. A. That Rev. A design evolved into a prototype designated as Rev. B, which CardiAQ evaluated and tested. That Rev. B design evolved into a prototype designated as Rev. C, which CardiAQ evaluated and tested. That Rev. C design evolved into a prototype designated as Rev. D, which CardiAQ evaluated and tested. That Rev. D design evolved into prototypes designated as the Rev. E series (including Rev. E2 through Rev. E4), which CardiAQ evaluated and tested.

CardiAQ, 2016 WL 6465411, at *14.

Without objection from Neovasc, the jury was instructed that a trade secret has to be "a process or device for continuous use in the operation of the business." J.A. 22392; *see* Restatement (First) of Torts § 757 cmt. b (1939). Neovasc argues that the jury could not find that Trade Secret 6—the "development history of CardiAQ's transcatheter replacement mitral valve prosthesis design," etc.—meets the requirement of continuous use. It rests that contention on a characterization of the development history as "negative know-how"—knowledge of what not to do—and the assertion that such negative know-how is not a protectable trade secret under Massachusetts law.

The district court properly denied Neovasc's argument for a new trial on this ground. The court explained that the jury had "a sufficient basis to conclude that CardiAQ continues to use trade secret 6 in the operation of its business" because, "[a]s it develops its TMVI device and works towards FDA approval, CardiAQ continues to use its past discoveries about what works and what does not," and "[i]ts development history has influenced the current design of its TMVI device, and will likely influence any future modifications to it." *CardiAQ*, 2016 WL 6465411,

at *14. That determination is supported by the evidence. J.A. 21061–62, 21066–68, 21070–72, 21116–17. Indeed, the district court cited a shareholder presentation by Neovasc stating that its "[i]ntimate understanding of what has and has not worked so far in the development of (percutaneous) valves" gave it a competitive advantage. *CardiAQ*, 2016 WL 6465411, at *14 (alteration in original) (quoting J.A. 1328 and citing J.A. 1301). The district court also held that "CardiAQ presented sufficient evidence that Mr. Lane used both the dead ends and breakthroughs in CardiAQ's development history to shape the design of the Tiara and to accelerate its development." *Id.*; *see also id.* at *18 (citing J.A. 21541–44).

The definition of Trade Secret 6, and the evidence and findings as to continuous use, are not limited to knowledge of what does not work—the described development history includes features that did work and were carried forward. We therefore need not consider whether a pure "negative know-how" trade secret would be unprotectable under Massachusetts law. Indeed, Neovasc bases its assertion entirely on an unpublished, non-precedential 1971 Massachusetts trial-court decision that actually found the trade secret at issue to be protectable. *Materials Dev. Corp. v. Atl. Advanced Metals, Inc.*, Eq. No. 30837, 1971 WL 16675, at ¶¶ 97, 101 (Mass. Super. Ct. Nov. 11, 1971). It is hardly clear that the dictum in that decision is the best view of how Massachusetts would now decide a negative-know-how case. *See Andrew Robinson Int'l, Inc. v. Hartford Fire Ins. Co.*, 547 F.3d 48, 51 (1st Cir. 2008) (where there is no controlling decision of the state's highest court, "the federal court must make an informed prophecy as to the state court's likely stance," by drawing upon "a variety of sources that may reasonably be thought to influence the state court's decisional calculus"); *see also Corporate Techs., Inc. v. Harnett*, 731 F.3d 6, 11 (1st Cir. 2013) (explaining that Massachusetts Superior Courts do not have precedential value in this

enterprise). Regardless, at most the 1971 decision reaches purely negative know-how; it does not deny trade-secret coverage in a situation, like the present one, where the trade secret is not so limited. Therefore, it was not an abuse of discretion for the district court to hold that the verdict of misappropriation was not against the clear weight of the evidence.

C

CardiAQ's damages expert, Mr. Wagner, testified that the trade-secret damages should be a reasonable royalty that Neovasc would have agreed to pay in a hypothetical negotiation occurring in 2010. In challenging the damages testimony, Neovasc complains that Mr. Wagner improperly relied on (1) 2015 data for the 2010 hypothetical negotiation; (2) the assumption that Neovasc received an eighteen-month head start from its trade-secret misappropriation; and (3) valuations of Trade Secrets 2 and 3, which the jury found not to have been misappropriated, in calculating damages for the misappropriation of Trade Secrets 4 and 6.[6] Neovasc seeks a new trial, arguing that the testimony was inadmissible and in any event rendered the damages award against the weight of the evidence. Appellants' Br. 45–46. We disagree.

1

The district court did not err in allowing Mr. Wagner to rely on valuations of Tiara from 2015 in making his royalty calculation. In the patent context, to which both parties refer in making their arguments about trade-secret damages, we and the Supreme Court have approved of appropriate uses of ex-post evidence. *E.g.,*

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[6] No damages were sought for the misappropriation of Trade Secret 5, *see CardiAQ*, 2016 WL 6465411, at *11 n.3; J.A. 21345, so we attribute none of the award to that trade secret.

Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1333 (Fed. Cir. 2009) ("[T]he hypothetical negotiation analysis 'permits and often requires a court to look to events and facts that occurred thereafter and that could not have been known to or predicted by the hypothesized negotiators.'" (quoting *Fromson v. Western Litho Plate & Supply Co.*, 853 F.2d 1568, 1575 (Fed. Cir. 1988)); *see Sinclair Ref. Co. v. Jenkins Petroleum Process Co.*, 289 U.S. 689, 698 (1933). Mr. Wagner offered a reasonable basis for relying on valuations from 2015, explaining that, in 2010, there was no external or internal valuation of Tiara, which was only a glimmer in Neovasc's eye. The 2015 information was more specifically focused on Tiara than any information from 2010. Moreover, Mr. Wagner in fact looked at value estimates essentially contemporaneous to the 2010 hypothetical valuation. He relied on Neovasc's Chief Executive Officer's testimony about his sense of value in 2009—namely, that he "knew the potential for a TMVI market was worth billions of dollars" and "knew there was a potential that a large company, such as Medtronic, could acquire a TMVI product for hundreds of millions of dollars." J.A. 21654; *see* J.A. 21305 (Mr. Wagner relying on that testimony).

Neovasc had the opportunity to cross-examine Mr. Wagner on whether he had adequately discounted figures from 2015 to produce a 2010 value. The jury ultimately awarded CardiAQ only $70 million of the $90 million Mr. Wagner testified was appropriate. The district court concluded: "The jury was instructed that the damages award should reflect what Neovasc would have paid in 2010 . . . , and there is no reason to believe the jury strayed from that instruction." *CardiAQ*, 2017 WL 215961, at *2 (district court's unappealed prejudgment interest award). We do not find an abuse of discretion by the district court, in admitting the evidence or denying a new trial, based on Neovasc's challenges to Mr. Wagner's testimony relating to the use of 2015 evidence.

2

Neovasc next argues that Mr. Wagner's testimony as to the value of Trade Secrets 4 and 6 is unsupported because he had an insufficient evidentiary basis for his assumption that Trade Secrets 4 and 6 solved 50% of the pertinent challenges faced by Neovasc in developing a successful TMVI device—challenges identified in an article by Ole De Backer. CardiAQ's Mr. Ratz testified that "at least 50 percent" of the challenges identified in the De Backer article were successfully addressed by "the Rev. E design," *i.e.*, Trade Secret 3. J.A. 20676–79. Yet the jury found that Neovasc did not misappropriate Trade Secret 3. According to Neovasc, the jury's rejection of the Trade Secret 3 claim means that the 50% valuation of Trade Secrets 4 and 6 is unsupported.

Neovasc did not move to set aside the verdict on the ground of inconsistency. Moreover, the jury awarded one sum of damages for both Trade Secrets 4 and 6, which, given Mr. Wagner's testimony, we take as awarded for each of those trade secrets, but awarded just once to avoid duplication.[7] Neovasc did not contend that Trade Secret 6, as opposed to Trade Secret 4, is too closely related to Trade Secret 3 to support a damages award where Trade Secret 3 was found not to be misappropriated. Neovasc argued simply that the jury's valuation of Trade Secrets 4 and 6 was contrary to the evidence under the demanding new-trial standard for such an evidence-focused challenge.

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[7] Mr. Wagner clearly explained that the total damages figure was $90 million, that the jury could award that figure by finding misappropriation of Trade Secrets 1 and 2 together, or 3, 4, or 6 separately, but that if the jury found misappropriation of multiple trade secrets, it should not add damages for each theory of liability.

The district court properly rejected the challenge. *CardiAQ*, 2016 WL 6465411, at *11–12. Mr. Wagner relied on the underlying testimony of Mr. Ratz, with his intimate knowledge of the TMVI challenges, as to the values of the particular trade secrets, as he was entitled to do. *See Williams v. Illinois*, 567 U.S. 50, 57 (2012) (expert may rely on facts established by other witnesses). Mr. Ratz testified that each of Trade Secrets 3, 4, and 6 was of equal value and that Trade Secrets 1 and 2 together were worth the same as the others separately. J.A. 20640; *see also CardiAQ*, No. 14-cv-12405-ADB, 2016 WL 8203206, at *3 (D. Mass. Apr. 25, 2016) (motion in limine allowing Dr. Ratz to testify as an expert on CardiAQ's damages); J.A. 20667 (entering Dr. Ratz as an expert in TMVI devices over objection). At least because the various trade secrets are overlapping, there is no identified inherent inconsistency in testimony that Trade Secret 3 is different from Trade Secrets 4 and 6, but each would solve 50% of the De Backer challenges and is worth the same amount. Neovasc was free to put on evidence that particular trade secrets, such as Trade Secrets 4 and 6, would be worth less than Trade Secret 3 and that Mr. Wagner did not fairly account for that difference. In the circumstances presented, the district court did not abuse its discretion in denying Neovasc's motion for a new trial on this ground.

3

Nor was Neovasc entitled to a new trial on the ground that there was no support for Mr. Wagner's assumption that Neovasc gained an eighteen-month head start by its misappropriation. Mr. Ratz testified that it took CardiAQ around twenty months to develop its secrets. He also testified that "based on [his] experience in the TMVI industry" it would have taken "at least 18 months to get from scratch to where we had gotten to during that period," after noting that "[t]here's a number of companies in the space competing, you know, bigger than Neovasc,

more resources than Neovasc, more experience in the heart valve space, that never got to a successful design." J.A. 20685–86. It is not an unreliable methodology to use CardiAQ's timeline and Mr. Ratz's experience-based opinion on how fast any company could possibly work as a basis for estimating Neovasc's head start. Neovasc was free to submit opposing testimony tending to show that Neovasc could have worked faster. *See CardiAQ*, 2016 WL 8203206, at *3. The district court properly denied Neovasc's request for a new trial on this ground.

D

The district court denied CardiAQ's request for an injunction that would prohibit Neovasc from working on its device for eighteen months. The court explained that "[t]he proposed 18-month suspension would be duplicative of the monetary relief, and is not warranted given the uncertainty in the TMVI market, the impact the injunction would have on Neovasc, and the public's interest in having access to a potentially life-saving technology." *CardiAQ*, 2016 WL 6465411, at *7. We reject CardiAQ's challenge to the denial of the requested injunction.

"According to well-established principles of equity," the Supreme Court has explained,

> a plaintiff seeking a permanent injunction must satisfy a four-factor test before a court may grant such relief. A plaintiff must demonstrate: (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction. The decision to grant or deny permanent injunctive relief is an act of equitable discretion by

> the district court, reviewable on appeal for abuse of discretion.

eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 391 (2006) (citations omitted). We see no abuse of discretion here.

CardiAQ argues that the text of its non-disclosure agreement with Neovasc conclusively establishes that its breach would result in irreparable harm not compensable by money damages. The agreement provides:

> The parties understand and acknowledge[] that money damages would not be sufficient remedy for any breach of this Agreement and that a party shall be entitled to equitable relief (including, but not limited to, an injunction or specific performance) in the event of any breach of the provision[s] of this Agreement.

J.A. 1285, quoted in Cross-Appellant's Br. 71. But it is not an abuse of discretion for the district court to examine the facts to determine whether a particular injunction is warranted—considering, among other things, the public interest, over and above the parties' interests. *See Baker's Aid v. Hussmann Foodservice Co.*, 830 F.2d 13, 16 (2d Cir. 1987); *see also JL Powell Clothing LLC v. Powell*, 590 F. App'x 3, 5 (1st Cir. 2014). Indeed, even if the non-disclosure agreement requires some injunction, it does not say *what* injunction is warranted or why *the particular* injunction CardiAQ seeks is appropriate.

Apart from relying on the non-disclosure agreement, CardiAQ's opening brief relies for claim of irreparable harm only on asserted harm from having to compete with Neovasc for clinical-trial partners, a competition that "could delay CardiAQ's time to market." Cross Appellant's Br. 75. But CardiAQ has not shown facts about competition for clinical-trial partners sufficient to compel a finding of non-speculative, much less irreparable, harm.

Nor has CardiAQ shown error in the district court's determination that the requested injunction would be "duplicative" of its monetary award, *i.e.*, that the damages awarded already effectively (though perhaps not perfectly) compensate CardiAQ for the eighteen-month harm that is the basis for its request for a project-suspension injunction. *See CardiAQ*, 2016 WL 6465411, at *7–8. CardiAQ argues that it still has not been compensated for the breach of the non-disclosure agreement because the jury awarded it no damages for that breach. But CardiAQ's damages expert explicitly stated the following:

> [T]he damages, if liability is proven on any of these causes of action, is $90 million. So if the jury finds that Trade Secrets No. 1 and 2 have been misappropriated, the number is $90 million. If they find either Trade Secret 3, 4, or 6 have been misappropriated, the number is still $90 million. *If they find that Neovasc breached the contract*, it's $90 million. . . . If they find liability under more than one of these theories, the number doesn't go up. I just think these are all independent legal ways of recovering the sum of money.

J.A. 21293–94 (emphasis added). That testimony is a sufficient basis for rejecting CardiAQ's contention that, even if the requested injunction would be duplicative of damages for trade-secret misappropriation, it would not be duplicative of (the same) damages for contract breach.

While CardiAQ makes arguments as to why the balance-of-the-hardships and public-interest factors should not outweigh Neovasc's admission in the non-disclosure agreement of irreparable harm, these arguments do not show error in the district court's factual findings on these factors or its overall weighing of equities. Especially in light of CardiAQ's failure to show irreparable harm or

why the remedies are not duplicative, the district court did not abuse its discretion in denying the injunction.[8]

III

For the foregoing reasons, we affirm the district court's judgment in all respects.

No costs awarded.

AFFIRMED

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[8] CardiAQ makes additional arguments for the first time in its reply brief, which we do not address because they are forfeited.