

# United States Court of Appeals for the Federal Circuit

2007-1483, -1509

PRAXAIR, INC.  
and PRAXAIR TECHNOLOGY, INC.,

Plaintiffs-Appellants,

v.

ATMI, INC.  
and ADVANCED TECHNOLOGY MATERIALS, INC.,

Defendants-Cross Appellants.

Christopher J. Harnett, Ropes & Gray LLP, of New York, New York, argued for plaintiffs-appellants. With him on the brief were Herbert F. Schwartz, Steven Pepe, David A. Bergan, Brian P. Biddinger, and Moriah R. Agovino.

Matthew D. Powers, Weil, Gotshal & Manges LLP, of Redwood Shores, California, argued for defendants-cross-appellants. With him on the brief were Timothy E. DeMasi, and Michael B. Eisenberg of New York, New York. Of counsel were Aaron M. Frankel and Theodore J. Mlynar, Kramer, Levin, Naftalis & Frankel LLP, of New York, New York.

Appealed from: United States District Court for the District of Delaware

Judge Sue L. Robinson

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Appeals from the United States District Court for the District of Delaware in case no. 03-CV-1158, Judge Sue L. Robinson.

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DECIDED: September 29, 2008

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Before LOURIE, BRYSON, and DYK, Circuit Judges.

Opinion for the court filed by Circuit Judge DYK. Opinion concurring in part and dissenting in part filed by Circuit Judge LOURIE.

DYK, Circuit Judge.

Plaintiffs Praxair, Inc. and Praxair Technology, Inc. (collectively “Praxair”) brought suit alleging that defendants ATMI, Inc. and Advanced Technology Materials, Inc. (collectively “ATMI”) had infringed three patents: U.S. Patent No. 6,007,609 (the “609 patent”); U.S. Patent No. 6,045,115 (the “115 patent”), and U.S. Patent No. 5,937,895 (the “895 patent”). The district court entered a final judgment concluding that claims 1, 2, 6, 7, and 8 of the ’609 patent and claims 18 and 20 of the ’115 patent were not invalid

and were infringed; declaring the '609 and '115 patents unenforceable due to inequitable conduct; and declaring claims 1, 3, 4, 5, 7, and 8 of the '895 patent invalid for indefiniteness. Praxair, Inc. v. ATMI, Inc., No. 03-1158-SLR (D. Del. July 2, 2007).

We affirm the district court's determination that the '115 patent is unenforceable due to inequitable conduct. We reverse the district court's unenforceability conclusion with respect to the '609 patent. We affirm the determination that the asserted claims of the '609 patent were not proven invalid, vacate the determination of infringement with respect to the '609 patent (because the district court used an incorrect claim construction), and remand for a determination as to infringement of the '609 patent under the correct claim construction. We also reverse the district court's judgment of invalidity for indefiniteness of the asserted claims of the '895 patent and remand for further proceedings. As to Praxair's appeal, we thus affirm-in-part, reverse-in-part, and remand. We dismiss ATMI's cross-appeal as improper.

## BACKGROUND

### I

Praxair is the present owner of the '609, '115, and '895 patents, all of which describe pressurized storage containers that limit potentially rapid accidental discharges of hazardous gasses that could otherwise pose a serious threat to health and safety. The gasses to which the patents relate, which are described in the claims as "fluids," are frequently used in the semiconductor industry and are ultimately used in their gas phase. However, they are often stored in pressurized cylinders that contain the chemical in a mix of its gas and liquid phases.

The asserted claims of the '609 patent, entitled "PRESSURIZED CONTAINER WITH RESTRICTOR TUBE HAVING MULTIPLE CAPILLARY PASSAGES," claim an apparatus with a flow restrictor comprised of multiple capillary passages in the "flow path" through which the chemical fluid, in either its gas or liquid phase, is dispensed.<sup>1</sup> One embodiment of the invention described in the '609 patent requires placement of this capillary flow restrictor inside the pressurized storage cylinder. The '115 patent, entitled "FAIL-SAFE DELIVERY ARRANGEMENT FOR PRESSURIZED CONTAINERS," also concerns the use of a capillary flow restrictor. Asserted claims 18 and 20 of the '115 patent require locating the capillary flow restrictor inside the pressurized tank near the axial-radial midpoint of the tank to prevent the discharge of liquid phase fluids, thereby avoiding corrosion of downstream equipment.<sup>2</sup>

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<sup>1</sup> Representative claim 1 of the '609 patent requires:

1. An apparatus for controlling the discharge of pressurized fluids from the outlet of a container, the apparatus comprising:
  - a container for holding a pressurized fluid in an at least partial gas phase;
  - an outlet port for delivering pressurized fluid from the container;
  - a fluid flow path defined at least in part by the outlet port for delivering pressurized fluid from the container; and,
  - a flow restrictor in the form of a tube defining multiple capillary passages along at least a portion of the fluid flow path.

'609 patent col.11 ll.5-17.

<sup>2</sup> Independent claim 18 of the '115 patent is representative of the asserted claims:

18. An apparatus for controlling the liquid phase discharge of pressurized fluids from the outlet of a pressurized tank containing toxic hydridic or halidic compounds, the apparatus comprising:
  - a container for holding a pressurized fluid in a liquid phase and an at least partial gas phase;
  - an outlet port for releasing pressurized gas from the container;

The '895 patent, entitled "FAIL-SAFE DELIVERY VALVE FOR PRESSURIZED TANKS," teaches the use of a valve that allows the release of fluid from a pressurized container only when the downstream pressure falls below a preset limit. This automatically limits the discharge of the pressurized fluid from the container, because any rapid release would increase the downstream pressure, closing the valve until the pressure fell back below the preset limit.<sup>3</sup>

Praxair produces pressurized gas storage and delivery cylinders under the product name "Uptime," which the parties agree are a commercial embodiment of at least the '609 and '115 patents. Since 1997, ATMI has produced the accused products, a line of pressurized gas storage and delivery cylinders referred to as "Vacuum-Actuated Cylinder" ("VAC") products. The VAC product is designed with a pressure regulation device inside the pressurized cylinder. The pressure regulation device includes sealed bellows that contain an inert gas at a known pressure. When the pressure downstream from the bellows exceeds a preset pressure, the bellows close, stopping the discharge of fluid from the cylinder. When the downstream pressure falls below the preset pressure, the bellows expand, opening a path around the bellows that allows fluid to leave the pressurized cylinder. The VAC products also include two or

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- a gas flow path defined at least in part by the outlet port for delivering pressurized gas from the container and a conduit defining an inlet located at about the axial mid-point of the container and at about the radial mid-point of the container; and,
  - a restrictor in the form of a restricted flow path along at least a portion of the gas flow path.

'115 patent col.9 l.23-col.10 l.19.

<sup>3</sup> The language of representative claim 1 of the '895 patent, upon which claims 3, 4, 5, 7, and 8 all depend, is set forth below.

three sintered metal filters, including at least one filter located inside the pressurized cylinder upstream from the bellows.<sup>4</sup> Praxair's Uptime and ATMI's VAC products directly compete. Indeed, they are the only commercially available, mechanical systems to control delivery of hazardous gasses of the type used in the semiconductor industry.

## II

On December 22, 2003, Praxair filed suit in the United States District Court for the District of Delaware alleging that ATMI's VAC products infringe the '609, '115, and '895 patents. Ultimately, Praxair asserted claims 1, 2, 6, 7, and 8 of the '609 patent; claims 18 and 20 of the '115 patent; and claims 1, 3, 4, 5, 7, and 8 of the '895 patent. On March 8, 2004, ATMI filed an answer asserting invalidity as an affirmative defense and asserting counterclaims for a declaratory judgment of noninfringement and invalidity as to the '609, '115, and '895 patents. ATMI subsequently filed an amended answer asserting an additional affirmative defense and counterclaim alleging unenforceability due to inequitable conduct with respect to all three patents.

On November 8, 2005, the district court entered a claim construction order, which, among other things, adopted Praxair's proposed constructions of the claim terms "flow restrictor" and "capillary" used in the '609 patent and the term "restrictor in the form of a restricted flow path" used in the '115 patent. On the same day, the district court entered partial summary judgment declaring claim 1 of the '895 patent, from which all of

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<sup>4</sup> The district court explained that "[t]he term 'sintering' refers to a high temperature solid-state diffusion bonding process in which metal powder is heated to a temperature just below the melting point of metal. The metal bonds to create a porous media having a random internal structure . . . ." Praxair, Inc. v. ATMI, Inc., 489 F. Supp. 2d 387, 391 n.2 (D. Del. 2007).

the other asserted claims of the '895 patent depend, invalid for indefiniteness. The district court reasoned that “the term ‘port body’ [in the '895 patent claim 1] . . . is not described, labeled, or coherently discussed in the patent. The meaning of the term ‘port body’ is not discernable from the patent specification.” Praxair, Inc. v. ATMI, Inc., No. 03-1158-SLR, slip op. at 7 (D. Del. Nov. 8, 2005).

On December 7, 2005, after a five day jury trial on validity and infringement of the asserted claims of the '609 and '115 patents, the jury returned a verdict finding that ATMI's accused products infringed all of the asserted claims of the '115 and '609 patents. The jury also determined that ATMI had not proven invalidity of any of the asserted claims.

On May 9, 2006, Praxair moved for a permanent injunction. On March 27, 2007, the district court denied Praxair's motion. Although the district court found that ATMI's accused VAC products were the only mechanical products in direct competition with Praxair's commercial products, it concluded that Praxair had not met its burden to prove the inadequacy of money damages. However, the court stated that “Praxair may renew its motion for injunctive relief following appellate review of the jury verdict.” Praxair, Inc. v. ATMI, Inc., 479 F. Supp. 2d 440, 444 (D. Del. 2007).

On December 12, 2005, the district court held a bench trial on ATMI's inequitable conduct defense and counterclaim with respect to the '609 and '115 patents. ATMI asserted inequitable conduct based on three types of prior art that it alleged the applicants withheld from the United State Patent and Trademark Office (“PTO”). On August 17, 2006, the district court issued an initial opinion on the issue of inequitable conduct, concluding that one item of prior art, the so-called “Max Light devices,” was not

material. The district court determined that two other items of prior art, U.S. Patent No. 5,409,526 (the “Zheng patent”) and restricted flow orifice (“RFO”) art were material, but deferred a final ruling on the issue of intent to deceive.<sup>5</sup>

On June 13, 2007, the district court issued a second inequitable conduct opinion. Although the district court determined that the Zheng patent was material and that the attorney who prosecuted the ’609 and ’115 patents, John Tolomei, had knowledge of the Zheng patent, the district court found that there had been no showing of intent to deceive the PTO with respect to the failure to disclose this reference. The district court instead credited Tolomei’s testimony that he had a good faith basis for failing to disclose the Zheng patent because he believed that it was not material.

However, the district court found that RFOs were material. As to intent to deceive, the district court found that both the inventors of the ’609 and ’115 patents and Tolomei had knowledge of RFO devices, which were widely used prior to the applications that led to the ’115 and ’609 patents. The district court focused, in particular, on four statements made in the prosecution history of the ’115 patent characterizing the prior art.<sup>6</sup> The district court viewed these statements as inconsistent with the existence of the prior art use of RFOs. The district court concluded that the applicants could not have made these assertions “had the RFO art been before the PTO.” Praxair, 489 F. Supp. 2d at 394. Given the lack of any testimony explaining the

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<sup>5</sup> As the district court explained in its findings of fact, an RFO “is a flow restrictor device presenting small holes, as small as 0.1 millimeters . . . through which gas flows” wherein the size of the hole restricts the rate of gas flow. Praxair, 489 F. Supp. 2d at 391.

<sup>6</sup> In the June 13, 2007, opinion, the district court incorrectly attributed these statements to the prosecution history of the ’609 patent. However, in its prior, August

failure to disclose RFOs to the PTO, the district court concluded that “the level of materiality of the RFO art is sufficiently high so as to support an ultimate finding of inequitable conduct.” Id.

On July 2, 2007, the district court entered a final judgment declaring that ATMI’s accused VAC products infringed all of the asserted claims of the ’609 and ’115 patents; that the ’609 and ’115 patents were unenforceable due to inequitable conduct; and that claims 1, 3, 4, 5, 7, and 8 of the ’895 patent were invalid for indefiniteness. Praxair timely appealed, challenging both the unenforceability ruling as to the ’609 and ’115 patents and the invalidity ruling with respect to the ’895 patent. We have jurisdiction over this appeal pursuant to 28 U.S.C. § 1295(a)(1). ATMI cross-appealed, challenging the determinations of infringement and no invalidity as to the asserted claims of the ’609 and ’115 patents. As discussed below, we hold that the cross-appeal is improper.<sup>7</sup>

## DISCUSSION

### I. Whether the ’115 and ’609 Patents Are Unenforceable Due to Inequitable Conduct

On appeal, Praxair first challenges the district court’s conclusion that the ’609 and ’115 patents are unenforceable due to inequitable conduct. “Each individual associated with the filing and prosecution of a patent application has a duty of candor

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17, 2006, opinion, the district court had properly attributed the same statements to the prosecution history of the ’115 patents.

<sup>7</sup> During the pendency of this appeal, the parties have advised us that they have reached a settlement agreement in which they agreed upon set amounts of damages due based upon the outcome of this appeal and that, even if successful, Praxair would not receive injunctive relief. Because the parties have not resolved the dispute as a whole and continue to have an ongoing interest in the dispute, this settlement agreement does not affect our duty and obligation to resolve the issues presented in this appeal (with the exception of the injunction issue discussed below). See Havens Realty Corp. v. Coleman, 455 U.S. 363, 370-71 (1982); Trovan, Ltd. v. Sokymat SA, Irori, 299 F.3d 1292, 1300 (Fed. Cir. 2002).

and good faith in dealing with the [PTO], which includes a duty to disclose to the [PTO] all information known to that individual to be material to patentability . . . .” 37 C.F.R. § 1.56(a); see also Honeywell Int’l Inc. v. Universal Avionics Sys. Corp., 488 F.3d 982, 999 (Fed. Cir. 2007) (“Applicants for patents have a duty to prosecute patent applications in the Patent Office with candor, good faith, and honesty.”).

Inequitable conduct in breach of this duty can be established by showing by “clear and convincing evidence that the applicant (1) made an affirmative misrepresentation of material fact, failed to disclose material information, or submitted false material information, and (2) intended to deceive the [PTO].” Cargill, Inc. v. Canbra Foods, Ltd., 476 F.3d 1359, 1363 (Fed. Cir. 2007). The required showings of materiality and intent are separate, and a showing of materiality alone does not give rise to a presumption of intent to deceive. See Kingsdown Med. Consultants, Ltd. v. Hollister, Inc., 863 F.2d 867 (Fed. Cir. 1988); see also M. Eagles Tool Warehouse, Inc. v. Fisher Tooling Co., Inc., 439 F.3d 1335, 1341 (Fed. Cir. 2006) (“[A] failure to disclose a prior art device to the PTO, where the only evidence of intent is a lack of a good faith explanation for the nondisclosure, cannot constitute clear and convincing evidence sufficient to support a determination of culpable intent.”). An inference of intent to deceive is generally appropriate, however, when (1) highly material information is withheld; (2) “the applicant knew of the information [and] . . . knew or should have known of the materiality of the information; and (3) the applicant has not provided a credible explanation for the withholding.” Ferring B.V. v. Barr Labs., Inc., 437 F.3d 1181, 1191 (Fed. Cir. 2006); see also Pfizer, Inc. v. Teva Pharms. USA, Inc., 518 F.3d 1353, 1367 (Fed. Cir. 2008) (applying the standard set out in Ferring to conclude that no

inference of intent was possible in the face of a credible good faith explanation for the withholding); Critikon, Inc. v. Becton Dickinson Vascular Access, Inc., 120 F.3d 1253, 1257 (Fed. Cir. 1997) (“[A] patentee facing a high level of materiality and clear proof that it knew or should have known of that materiality, can expect to find it difficult to establish ‘subjective good faith’ sufficient to prevent the drawing of an inference of intent to mislead.”). “Once threshold findings of materiality and intent are established, the trial court must weigh them to determine whether the equities warrant a conclusion that inequitable conduct occurred.” Purdue Pharma L.P. v. Endo Pharms. Inc., 438 F.3d 1123, 1128 (Fed. Cir. 2006).

We review a district court’s determination as to inequitable conduct for abuse of discretion, but review findings as to the threshold factual issues of materiality and intent for clear error. Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V., 528 F.3d 1365, 1374 (Fed. Cir. 2008); Aventis Pharma S.A. v. Amphastar Pharms., Inc., 525 F.3d 1334, 1343 (Fed. Cir. 2008).

We address the district court’s findings and conclusions with respect to the ’115 and ’609 patents separately.

#### A. The ’115 Patent

##### 1. Materiality

The district court set forth its reasoning as to materiality in an August 17, 2006 opinion, finding that “the RFO art is material to the prosecution of the [’115 patent] . . . .” Praxair, Inc. v. ATMI, Inc., 445 F. Supp. 2d 437, 479-80 (D. Del. 2006). The district court emphasized the widespread use of RFO devices prior to the invention of the ’115 patent, and appears to have based its finding of materiality primarily on the similarity

between the use of capillaries in the '115 patent and the use of a small, flow-restricting hole in prior art RFO devices.

An RFO is a flow restrictor device presenting a small hole, as small as 0.1 millimeters (mm), through which gas flows. The size of the hole determines the rate of flow. This description is similar to that of a capillary, as required in the patents, and, therefore, would have been material to an examiner.

Id. (internal citation omitted).

Praxair urges that prior art use of RFOs cannot have been material to the prosecution of the '115 patent because prior art applications of RFOs did not meet all of the '115 patent's claim limitations. In this connection, Praxair challenges the district court's finding that RFOs are similar to the capillaries described in the '115 patent. Praxair argues that capillaries are necessarily long and narrow, while prior art uses of RFOs involved a flow restrictor comprised of a small hole that although narrow, is not long like a capillary.

Praxair is correct that the structure of prior art RFOs described by the district court did not embody all claim elements of '115 patent. However, the use, in both prior art RFO devices and the '115 patent, of a narrow passageway to restrict fluid flow is sufficient to meet the threshold for materiality, and we conclude that the district court's finding that RFOs were material on this basis was not clearly erroneous. Baxter Int'l, Inc. v. McGaw, Inc., 149 F.3d 1321, 1328 (Fed. Cir. 1998) (“[M]ateriality is not analyzed in a vacuum. It is not dependent on a single element viewed in isolation. Rather, it is judged based upon the overall degree of similarity between the omitted reference and the claimed invention in light of the other prior art before the examiner.”).

Finally, Praxair asserts that prior art use of RFO devices would have been cumulative in the prosecution of the '115 patent because other references were before the examiner that disclosed similar flow-restricting devices. Information that is cumulative is not material. See, e.g., Honeywell Int'l, 488 F.3d at 1000. However, we decline to address this argument on appeal, because we conclude that Praxair waived this argument by failing to raise it before the district court.<sup>8</sup> See Golden Bridge Tech., Inc. v. Nokia, Inc., 527 F.3d 1318, 1322 (Fed. Cir. 2008); see also, e.g., Singleton v. Wulff, 428 U.S. 106, 120 (1976) (“It is the general rule, of course, that a federal appellate court does not consider an issue not passed upon below.”).

We sustain the district court’s finding that the RFO prior art was material.

## 2. Intent

Here intent to deceive may be inferred from findings: (1) that the RFO art was highly material to the prosecution of the '115 patent, (2) that the applicants knew of the RFO art and knew or should have known of its materiality, and (3) that the patentee has failed to come forward with any credible good faith explanation for the applicants’ failure to disclose prior art use of RFOs to the PTO. See Pfizer, 518 F.3d at 1367; Ferring, 437

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<sup>8</sup> Before the district court, Praxair argued only that a reference cited in the prosecution of the '115 patent, U.S. Patent No. 4,738,693 (the “693 patent”) rendered cumulative the Zheng patent, the nondisclosure of which ATMI had also asserted as a basis for finding inequitable conduct before the district court. However, Praxair never asserted before the district court that the '693 patent made the RFO prior art cumulative. Indeed, Praxair never asserted in the district court that any reference before the PTO rendered the prior art use of RFOs cumulative. Although, as discussed below, Tolomei testified during the bench trial on inequitable conduct that in retrospect he believed some of the references that had been before the examiner would have disclosed the use of RFOs, he was unable to point to any specific reference to support this statement.

F.3d at 1191; Critikon, 120 F.3d at 1257. Praxair challenges the district court's findings as to each of these elements.

a. High Degree of Materiality

The district court did not conclude that the prior art RFOs were themselves highly material. Rather, the district court appears to have concluded that the RFOs were highly material in the context of four statements made in the course of the '115 prosecution.<sup>9</sup> The four statements, as noted in the district court's August 17, 2006, opinion, were:

(1) The prior art did not teach the claimed "extreme limitation in flow" used "to provide a commercially practical container" that prevents "the catastrophic discharge" of toxic contents; (2) Existing safety measures were limited to "highly complex methods" and "elaborate systems;" (3) There was no indication in the prior art to use "severe flow restriction" to "overcome [ ] the problems of delivering highly toxic fluids from portable containers;" and (4) "[N]one of the prior art comes close to disclosing a restriction in the flow path from a pressurized container that has a diameter that does not exceed 0.2 mm."

Praxair, 445 F. Supp. 2d at 480 n.8. The district court found that the prior art RFO devices contradicted these statements because prior art RFO devices provided "a safety measure that appears neither 'highly complex' nor 'elaborate,'" allowed significant flow limitation, and "had standardized diameters as small as 0.1 mm." Praxair, 489 F. Supp. 2d at 394. In its June 13, 2007, opinion, the district court concluded that the prior art use of RFOs was highly material to the prosecution of the '115 patent, and relied on this high degree of materiality to infer intent to deceive the PTO. Id. at 393-94.

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<sup>9</sup> The finding of intent could also, potentially, have been based on the theory that the applicants affirmatively misrepresented the nature of the prior art by making the four statements emphasized by the district court. However, the district court did not explicitly find an affirmative misrepresentation.

Praxair offers no coherent argument as to why RFOs were not highly material in light of these four statements. We sustain the district court's finding that the prior art use of RFOs was highly material to the prosecution of the '115 patent.

b. Knowledge

Having concluded that the undisclosed prior art use of RFOs was highly material in the context of the four statements made during the prosecution of the '115 patent, the district court also explicitly found that the prosecuting attorney (Tolomei) and one of the inventors (LeFebre) knew of the undisclosed RFO art. Praxair, 445 F. Supp. 2d at 480 ("Messrs. LeFebre . . . and Tolomei . . . admitted to an awareness of the RFO prior art.").<sup>10</sup>

Praxair challenges the district court's finding that Tolomei and LeFebre had knowledge of the prior art use of RFO devices. Both Tolomei and LeFebre testified during the bench trial that they had been aware of RFOs. Tolomei's testimony on this topic at trial was as follows:

Q. In the 1997 to 2000 time frame, did you know about the prior art use of restricted flow orifices in the outlet port of a valve head of a pressurized gas cylinder?

A. Yes.

Q. And what did you know about them?

A. That any time there's a change in the — in the diameter of something, in a valve or any flow control device, that could be . . . a restricted orifice.

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<sup>10</sup> It is not entirely clear whether the district court found that inventor Martin knew of RFO devices. Although the district court made such a finding, it also stated in a footnote that there had been no evidence at the bench trial as to Martin's knowledge of RFO devices. Praxair, 489 F. Supp. 2d at 395 n.8. Resolution of this issue is unnecessary, however, because we sustain the district court's findings and conclusion as to inequitable conduct based on its findings as to LeFebre and Tolomei.

J.A. at 9304. Likewise, LeFebre's deposition testimony, which was incorporated into the trial record, also indicated knowledge of the prior art use of RFO devices.

Question: Okay. Were you aware of flow restrictors that were on the market at the time that you filed your patent application on December 18, 1997?

Answer: Yes.

....

Question: And what are the names of those flow restrictors?

Answer: I don't know that they have particular names. I can define them mechanically.

Question: Please go ahead and define them.

Answer: The simplest one is just a given orifice, a hole, very small hole, typically, or multiple holes.

Question: Any others?

Answer: Stainless steel, frits. Centered frits, I believe, packed columns that were used as flow restrictors. There were others, but I do not recall.

J.A. at 9357-58.

Praxair does not dispute this clear testimony but urges that the district court improperly relied on the testimony of a Praxair employee, Furhop, regarding Praxair's prior use of RFO technology, as proving Tolomei and LeFebre's knowledge. Praxair points out that Tolomei and LeFebre did not work for Praxair, and that Praxair was not involved in the prosecution of the '115 patent. However, the district court recognized that there was no allegation of inequitable conduct by any Praxair employee and simply relied on Furhop's testimony as proof of widespread commercial use of RFOs at the

time. We see no error in the district court's reliance on Furhop's testimony for that purpose.

Praxair also suggests that the district court improperly based its finding of knowledge with respect to Tolomei and LeFebre on their supposed knowledge of an article describing prior-art RFO devices written by Suzanne Larson, even though the court had earlier found that they were unaware of the article. We do not think that the district court implicitly attributed knowledge of the Larson article to LeFebre and Tolomei. The district court relied heavily on the Larson article as a technical explanation of prior art RFO devices in reaching its findings as to how prior art RFO devices worked, but there is nothing improper about a court's reliance on an expert's factual explanation of an unfamiliar technology. The district court's finding of high materiality did not depend on the technical details disclosed in the Larson article, nor was the district court's finding of intent based on Tolomei and LeFebre's knowledge of such details.

Thus, in light of their own testimony, there is no question that Tolomei and LeFebre "knew of the information" withheld from the PTO. Ferring, 437 F.3d at 1191. The applicants were aware of RFO technology, and Tolomei at least was aware of its obvious materiality in light of the four statements quoted above made by him to the examiner.

#### c. Lack of Good Faith Explanation

Here, the district court found that there was no good faith explanation for the failure to disclose highly material information to the PTO. Praxair contends that a good faith explanation was offered, referring to testimony by Tolomei. Tolomei offered conclusory testimony that he never "intentionally misled the United States Patent Office

about anything” at any time during his career, J.A. at 9235, and that with respect to the '609 and '115 patent prosecutions he “did not knowingly withhold any information from the Patent and Trademark Office,” J.A. at 9236. Such statements are entitled to no weight. Tolomei also testified as follows:

Q. And did the examiner – isn't it true that the examiner did not have before him a piece of prior art that showed the use of a restricted flow orifice in the outlet port of a valve head of a pressurized gas cylinder?

A. No, I don't believe – I believe he would have had prior art that showed that.

Q. Sitting here today, can you point to any such prior art that the examiner had before him in the '609 patent?

A. Well, again I – I tried to – I asked if he wanted me to go through the file history. I would have to do that, I think. The references that were disclosed in all fairness could be looked at as showing that.

J.A. at 9304-05 (emphasis added). At best, Tolomei expressed his opinion, at the time of the trial, that unspecified references that had been before the examiner would have rendered disclosure of RFO devices cumulative. However, this testimony is insufficient as a good faith explanation in three respects: Tolomei's testimony does not suggest that, at the time of the prosecution of the '115 patent, he believed that disclosure of the RFO art would have been cumulative; he also does not actually state that the alleged cumulateness was the reason he failed to disclose prior art RFO devices to the PTO; and he was unable to identify any specific reference that rendered the RFOs cumulative. The fact that Tolomei may have cited the '693 patent to the PTO in another context is entirely irrelevant to his good faith in failing to disclose the RFO prior art. Hindsight construction of reasons why a reference might have been withheld cannot

suffice as a credible explanation of why, at the time, the reference was not submitted to the PTO.

d. Inference of Intent

Based on its predicate findings that the RFO art was highly material, that the applicants knew of the RFO art and at least should have known of its materiality, and that the applicants had failed to present any good faith explanation for withholding the highly material RFO art from the PTO, the district court properly inferred that the applicants intended to deceive the PTO by failing to disclose the RFO art. See Ferring, 437 F.3d at 1191.

Praxair urges that the district court's inference of intent was based in part on a mistaken assumption as to the relevance of Praxair's own use of RFO devices prior to the filing of the applications that resulted in the '609 and '115 patents. Although the district court erred in suggesting that Praxair's own use of RFO devices prior to the filing of the application for the '115 patent was relevant to the question of intent, Praxair, 489 F. Supp. 2d at 395 n.9, we conclude that this error was harmless. The district court mentioned Praxair's own use of RFO technology in a footnote, and expressly limited its reliance on this fact to "buttress[ing] the inference of intent permitted . . . in view of the high materiality present here." Id.<sup>11</sup> Under these circumstances, we conclude that the

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<sup>11</sup> The district court stated:

[T]he fact that Praxair was using "old" RFO technology in its own cylinders (which it shipped to customers) for several years prior to filing the '115 and '609 patents, and that Mr. LeFebre built devices with RFOs himself, buttress the inference of intent permitted under Bruno in view of the high materiality present here.

Praxair Inc., 489 F. Supp. 2d at 395 n.9 (citations omitted).

district court's overall finding of intent was not affected by this error. We therefore sustain the district court's findings of materiality and intent and the district court's ultimate conclusion as to inequitable conduct with respect to the '115 patent.

#### B. The '609 Patent

While the district court did not err in finding that the RFO prior art was material to the '609 patent, we cannot affirm the district court's inference of intent with respect to the '609 patent. As with the '115 patent, the district court found that prior art RFO devices were highly material with respect to the '609 patent prosecution based on the four statements previously discussed, finding materiality with respect to both patents because "the applicants could not have made several arguments in furtherance of patentability had the RFO art been before the PTO." Praxair, 489 F. Supp. 2d at 394. However, these statements were actually made only in the prosecution of the '115 patent, and not in the prosecution of the '609 patent.

At the time the four statements discussed were made during the prosecution of the '115 patent, there had already been a notice of allowability indicating that all claims of the '609 patent would be issued. ATMI has not established, or even asserted, that the statements in the prosecution of the '115 patent somehow infected the prosecution of the '609 patent. Absent the four statements, the district court did not make any finding of intent with respect to the withholding of RFO art during the prosecution of the '609 patent. Nor has ATMI convincingly demonstrated that the prior art use of RFOs standing alone was highly material to the prosecution of the '609 patent. We read the district court's reference to "the high materiality of the RFO art," Praxair, 489 F. Supp. 2d at 395, as concluding that the RFO art was only highly material in light of the four

statements made during the prosecution of the '115 patent. Accordingly, we reverse the district court's finding of inequitable conduct with respect to the '609 patent.

## II. Whether the '895 Patent Is Invalid for Indefiniteness

Praxair also challenges the district court's conclusion that the '895 patent is invalid for indefiniteness. Indefiniteness is a matter of claim construction, and the same principles that generally govern claim construction are applicable to determining whether allegedly indefinite claim language is subject to construction. Datamize, LLC v. Plumtree Software, Inc., 417 F.3d 1342, 1348 (Fed. Cir. 2005). Indefiniteness, like claim construction, is a question of law, and we review a district court's entry of summary judgment on the issue of indefiniteness de novo. Id. at 1347.

The second paragraph of 35 U.S.C. § 112 requires that the specification of every patent must "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." This requirement serves a public notice function, ensuring that the patent specification adequately notifies the public of the scope of the patentee's right to exclude. See Honeywell Int'l, Inc. v. Int'l Trade Comm'n, 341 F.3d 1332, 1338 (Fed. Cir. 2003). A claim satisfies the definiteness requirement of § 112 "[i]f one skilled in the art would understand the bounds of the claim when read in light of the specification." Exxon Research & Eng'g Co. v. United States, 265 F.3d 1371, 1375 (Fed. Cir. 2001). A claim will be found indefinite only if it "is insolubly ambiguous, and no narrowing construction can properly be adopted . . . ." Id. On the other hand, "[i]f the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one

over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds.” Id.

Claim 1 of the '895 patent requires:

1. An apparatus for controlling the discharge of pressurized fluids from the outlet of a pressurized tank, the apparatus comprising:
  - a port body for communication with the outlet of a pressurized tank defining a fluid discharge path;
  - a valve element fixed in or upstream of the port body and adapted for movement between a sealing position that blocks fluid flow through the fluid discharge path and an open position that permits fluid flow along the fluid discharge path; and
  - a diaphragm defining an interior volume isolated from the pressure condition upstream of the valve element and engaged with the valve element to control the movement of the valve element in a manner that retains the valve element in the sealing position until a pressure differential between the interior volume of the diaphragm and the interior of the port body moves the valve element to the open position.

'895 patent col.8 ll.27-43. Praxair urges on appeal, as it did before the district court, a construction of the term “port body” as “a structure that connects to the outlet of a pressurized tank and includes a path for the discharge of a fluid from the pressurized tank.” (Appellant’s Br. 52.) More specifically, Praxair contends that, with respect to the embodiment of the invention pictured in Figure 2 of the '895 patent, reproduced below, the “port body” consists of a combination of the “valve body,” which is identified as item 50 in Figure 2, along with the unlabeled, threaded structure immediately below the valve body, which is shaded in the opposite direction in Figure 2. The district court rejected Praxair’s proposed construction because the term “is not described, labeled, or coherently discussed in the patent,” and its meaning “is not discernable from the patent.” Similarly ATMI argues that there is no coherent description of the characteristics of the port body in the specification of the '895 patent.

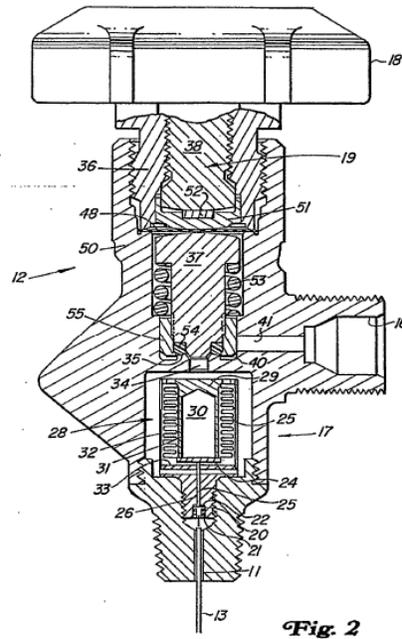


Fig. 2

We do not agree. A discussion of two embodiments in the “Summary of the Invention” section of the specification describes the structure and location of the port body as follows:

Accordingly, in a preferred apparatus embodiment this invention is an apparatus for controlling the discharge of pressurized fluids from the outlet of a pressurized container. The apparatus comprises a port body for communication with the outlet of a pressurized container to define a fluid discharge path from the container. A pressure regulator fixed in or ahead of the port body contains a valve element adapted for movement between a sealing position that blocks fluid flow through the fluid discharge path and an open position that permits fluid flow along the fluid discharge path. A diaphragm defines an interior volume isolated from the pressure condition upstream of the port body and engaged with the valve element for controlling the movement of the valve element in a manner that retains the valve element in the sealing position until a pressure differential between the inside of the diaphragm relative to the pressure outside the diaphragm moves the valve element to the open position.

In further limited apparatus embodiment this invention is a cylinder and a valve assembly for containing pressurized fluid and controlling the discharge of pressurized fluids from the cylinder. The cylinder and valve assembly comprises a cylinder defining a cylinder opening. The valve assembly includes a port body adapted for sealing engagement with the cylinder opening. A fluid inlet port is defined by the port body and communicates with the cylinder opening. A fluid outlet port is defined by the port body and located outside the cylinder. A fluid discharge path is defined by the valve body between the fluid inlet port and the fluid outlet

port. A manually operated shut off valve controls fluid flow along the fluid discharge path. An automatic valve contains a valve element biased into a sealing position that blocks fluid flow along the fluid discharge path. A sealed bellows, located downstream of the valve element along the fluid discharge path, has one portion fixed with respect to the port body and another portion operably linked to the valve element to move the valve element from the sealing position to an open position when a relative pressure difference between the interior and exterior of the bellows expands the bellows.

'895 patent col.4 ll.26-64 (emphases added). Although the discussion of the port body in the '895 patent's specification may not be a model of clarity, the specification adequately explains that the port body is a housing that sealingly engages the outlet of the cylinder and defines the fluid discharge path.

ATMI argues that Praxair's construction of port body does not conform to the requirements of claim 1 of the '895 patent because the valve element is not upstream of the port body. The claim requires "a valve element fixed in or upstream of the port body." '895 patent col.8 l.32. Claim 1 does not require that the valve element be located upstream from the port body, and consistent with the requirements of claim 1, Figure 2 shows a valve element "fixed in" the valve body.

Relying on the Supreme Court's opinions in Holland Furniture Co. v. Perkins Glue Co., 277 U.S. 245, 256-57 (1928), and United Carbon Co. v. Binney & Smith Co., 317 U.S. 228, 236 (1942), ATMI also urges that Praxair's suggested construction is improper because it defines the port body exclusively by its function, even though the parties agree that the term port body is not a means-plus-function limitation pursuant to 35 U.S.C. § 112 ¶ 6. We do not agree that construing the port body as "a structure that connects to the outlet of a pressurized tank and includes a path for the discharge of fluid from the pressurized tank," as Praxair has proposed, defines the port body exclusively

by its function. (Appellant's Br. 52.) Rather, Praxair's proposed construction describes the nature of the structure based on its critical structural attributes, which are described in the specification of the '895 patent.

Finally, ATMI contends that the deposition testimony of an expert witness for Praxair in another case (Dr. Fronczak) demonstrates that the '895 patent is indefinite because Dr. Fronczak could not identify and depict a single structure that served as the port body based on his reading of the specification and claims of the '895 patent. Even if we were to agree that Dr. Fronczak was unable to reach a single consistent construction of the port body, such extrinsic evidence would not prove the '895 patent invalid, since indefiniteness is a legal rather than a factual question. See, e.g., Datamize, 417 F.3d at 1347.

We conclude that the term "port body" as used in the '895 patent is not indefinite, adopt Praxair's construction of the term port body, and reverse the district court's judgment of invalidity for indefiniteness. We remand to the district court for further proceedings with respect to the '895 patent.

### III. ATMI's Cross-Appeal

ATMI filed a cross-appeal in this case, challenging the district court's determination that the '115 and '609 patents were infringed and not invalid.<sup>12</sup> ATMI's cross-appeal is improper, and we lack jurisdiction over the cross-appeal.

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<sup>12</sup> In its July 2, 2007 judgment order, the district court declared that the '609 and '115 patents were infringed, and also that these patents were unenforceable due to inequitable conduct. This formulation of the judgment is confusing because if the district court finds a patent invalid or unenforceable, it should not simultaneously declare the patent infringed.

As we have repeatedly explained, a party lacks standing to cross-appeal unless it is adversely affected by the judgment it seeks to challenge. TypeRight Keyboard Corp. v. Microsoft Corp., 374 F.3d 1151, 1156 (Fed. Cir. 2004); Bailey v. Dart Container Corp., 292 F.3d 1360, 1362 (Fed. Cir. 2002).

In this case, ATMI succeeded in the district court in obtaining a determination that the '609 and '115 patents are unenforceable due to inequitable conduct. A determination of unenforceability bars a finding of infringement, see Cargill, Inc., 476 F.3d at 1362, and similarly moots any issue of invalidity. See, e.g., Kingsdown Med. Consultants, 863 F.2d at 877 (“When a court has finally determined that inequitable conduct occurred in relation to one or more claims during prosecution of the patent application, the entire patent is rendered unenforceable.”). The determinations that ATMI seeks would, thus, not “enlarge [ATMI’s] own rights under the judgment or . . . lessen the rights of [Praxair] . . . .” Bailey, 292 F.3d at 1362. Accordingly, we dismiss ATMI’s cross-appeal.

Where, as here, an improper cross-appeal is dismissed, we may nonetheless consider the arguments raised in the improper cross-appeal as alternative grounds upon which we could affirm the judgment of the district court. See TypeRight, 374 F.3d at 1157 (addressing merits of arguments raised in improper cross-appeal as “as an alternate ground for affirming the district courts judgment”); Bailey, 292 F.3d at 1362 (“[A]n appellee can present in this court all arguments supported by the record and advanced in the trial court in support of the judgment[,] . . . even if those particular arguments were rejected or ignored by the trial court.”). We turn to the merits of ATMI’s assertions.

ATMI challenges the jury verdicts finding both the '115 and '609 patents infringed and not invalid. Because we affirm the district court's determination of unenforceability with respect to the '115 patent, there is no need to consider ATMI's challenges to the jury verdicts as to the issues of infringement and validity with respect to the '115 patent. See General Electro Music Corp. v. Samick Music Corp., 19 F.3d 1405, 1412-13 (Fed. Cir. 1994); Cargill, 476 F.3d at 1362. Accordingly, we consider the merits of ATMI's challenges only as to the jury verdict regarding infringement and validity of the '609 patent.

#### A. Claim Construction

ATMI urges that the jury's verdict of infringement of the '609 patent was based on a flawed claim construction. In particular, ATMI challenges the district court's construction of two claim terms, "flow restrictor" and "capillary," used in the '609 patent. Both claim terms are used in independent claim 1 of the '609 patent, in a limitation that is incorporated into each of the asserted claims, all of which depend from claim 1. Claim 1 provides as follows:

1. An apparatus for controlling the discharge of pressurized fluids from the outlet of a container, the apparatus comprising:
  - a container for holding a pressurized fluid in an at least partial gas phase;
  - an outlet port for delivering pressurized fluid from the container;
  - a fluid flow path defined at least in part by the outlet port for delivering pressurized fluid from the container; and,
  - a flow restrictor in the form of a tube defining multiple capillary passages along at least a portion of the fluid flow path.

'609 patent col.11 ll.5-17 (emphasis added). The district court construed the emphasized clause to require that "[t]he path followed by the gas phase pressurized fluid includes a structure in the form of a tube with multiple narrow passages that serve

to restrict the rate of flow.” Praxair, No. 03-1158-SLR, slip op. at 8 (D. Del. Nov. 8, 2005). Claim construction is a question of law that we review without deference. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc).

#### 1. “Flow Restrictor”

ATMI argues that the district court’s construction of “flow restrictor” was improper in that it failed to require “severe” flow restriction. In its November 8, 2005, claim construction order, the district court addressed this severe flow restriction argument only with respect to the parallel claim limitations of the ’115 patent, concluding that ATMI’s suggested severe restriction limitation “describe[d] an embodiment of the invention” of the ’115 patent and refusing to “read limitations of the preferred embodiments in to the claims.” Praxair, No. 03-1158-SLR, slip op. at 6. The district court did not expressly discuss ATMI’s severe flow restriction argument with respect to the ’609 patent, but implicitly rejected ATMI’s severe flow restriction limitation by construing “flow restrictor” to require only a structure that “serve[s] to restrict the rate of flow.” Id. at 8.

After the district court’s claim construction, ATMI renewed its claim construction arguments as an objection to the district court’s jury instructions on claim construction, as required by Federal Rule of Civil Procedure 51(c). At the charge conference, with the court’s approval, ATMI adopted its prior objections and arguments as to claim construction. ATMI thus preserved its objection to Praxair’s proposed construction on the ground that it was too broad and was inconsistent with the purpose of the invention, which was to “provide a measure of safety even if the flow comprised highly toxic gas.” J.A. at 531.

ATMI urges that the district court's construction cannot be reconciled with the '609 patent specification, which it contends requires severe restriction of gas flow. ATMI relies primarily on isolated statements in the Background and Summary of the Invention sections of the '609 patent. E.g. '609 patent col.3 ll.58-61; col.4 ll.31-34; col.5 ll.18-20. It is apparent, however, that these statements pertain to specific embodiments of the invention rather than to the invention as a whole. For example, ATMI directs us to a statement in the Summary of the Invention section that “[t]he mass flow rate is typically at or above the maximum desired flow rate at which the container must supply gas to the end use device, but yet restrictive enough to severely limit any accidental discharge rate.” Id. col.3 ll.58-61 (emphases added). While ATMI focuses on “severely limit,” the word “typically” appears in the same sentence, implying that the passage describes only the most common embodiment rather than the full scope of the invention. Likewise, other references to severe restriction make clear that they pertain to specific embodiments. E.g. id. col.4 ll.22-34 (stating that “in a broad embodiment” of the invention, the gas may be restricted “to a minimal rate that is typically less than 100% more than the maximum gas delivery rate required from the container” (emphasis added)); id. col.4 l.66-col.5 l.20 (stating that “in a limited apparatus embodiment” gas flow is restricted “to a mass flow rate of less than 5 cc per minute” (emphasis added)). We conclude that the term “flow restrictor” in claim 1 of the '609 patent cannot be read to incorporate a “severe” flow restriction requirement.

That is not, however, the end of the matter. Because the court has an independent obligation to construe the terms of a patent, we need not accept the constructions proposed by either party, and our rejection of AMTI's construction does

not necessarily lead to the conclusion that the district court's construction was correct. Exxon Chem. Patents, Inc. v. Lubrizol Corp., 64 F.3d 1553, 1556 (Fed. Cir. 1995). Here the district court's construction requires merely that the flow restrictor structure "serve to restrict the rate of flow," Praxair, No. 03-1158-SLR, slip op. at 8, and appears to include a device that creates any flow restriction, no matter how minor or inconsequential. We think that this construction is also not correct.

This court has often emphasized that "claims 'must be read in view of the specification, of which they are a part,'" Phillips v. AWH Corp., 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (quoting Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)), and has explained that "the specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" Id. (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The fundamental object of the invention disclosed by the '609 patent specification is to prevent a hazardous situation from the uncontrolled discharge of gas. See, e.g., '609 patent, Abstract ("[t]he present invention uses a flow restrictor . . . to minimize any discharge of toxic gases"); id. ("use of this arrangement to provide a flow restriction . . . provides a virtually fail safe system for preventing hazardous discharge of fluid"); id. (capillaries "minimize any discharge of gas"); id. ("[l]imiting the accidental discharge of fluid from the cylinder to gas phase fluids greatly reduces the uncontrolled mass flow rate at which fluid can escape"); id., Background of the Invention, col.2 ll.14-16 (addressing prior art that "discloses systems for preventing such catastrophic release of toxic fluids"). The claims of the patent must be read in light of the specification's consistent emphasis on this fundamental feature of

the invention. See Ormco Corp. v. Align Tech., Inc., 498 F.3d 1307, 1313-14 (Fed. Cir. 2007) (construing claims to include limitation where doing so “most naturally aligns with the patent's description of the invention” (quotation marks omitted)); Alloc, Inc. v. Int'l Trade Comm'n, 342 F.3d 1361, 1370 (Fed. Cir. 2003) (looking to “whether the specification read as a whole suggests that the very character of the invention requires the limitation be a part of every embodiment”). In this case, the specification teaches that the flow restriction must be sufficient to achieve the overall object of the invention – that is, to prevent a hazardous release of gas. For this reason, we conclude that the term “flow restrictor” as used in claim 1 of the '609 patent requires a restriction of flow sufficient to prevent a hazardous situation. Thus, the term “flow restrictor” should be construed as “a structure that serves to restrict the rate of flow sufficiently to prevent a hazardous situation.”

Because we have adopted a new claim construction on appeal, and this is not a case in which it is clear from the record that the accused device does or does not infringe, a remand is warranted for a determination of infringement under the correct claim construction. See Exxon Chem. Patents, Inc. v. Lubrizol Corp., 137 F.3d 1475, 1478-79 (Fed. Cir. 1998) (recognizing new trial may be appropriate where new claim construction is adopted on appeal).

## 2. “Capillary”

ATMI also challenges the district court's construction of the term “capillary,” which is used in the same clause of claim 1 of the '609 patent as “flow restrictor,” which requires “a flow restrictor in the form of a tube defining multiple capillary passages along at least a portion of the fluid flow path.” '609 patent col.11 ll.16-17. The district court

construed capillary to mean “pertaining to or resembling a hair; fine and slender.” Praxair, No. 03-1158-SLR, slip op. at 6 (citing The American Heritage Dictionary 236 (2d ed.)). ATMI proposed instead construing the phrase “a tube defining multiple capillary passages” to mean “an elongated cylindrical structure with at least two uniformly shaped bores along its length, of an internal diameter such that friction significantly impedes the mass flow rate of gas through the bores.” J.A. at 535.

ATMI first argues that the district court improperly relied on an abstract dictionary definition of the word capillary. Contrary to the thrust of ATMI’s argument, however, our decisions, including Phillips, 415 F.3d at 1322, do not preclude the use of general dictionary definitions as an aid to claim construction. We have recognized that “[d]ictionaries or comparable sources are often useful to assist in understanding the commonly understood meaning of words” and have “the value of being an unbiased source ‘accessible to the public in advance of litigation.’” Id. (quoting Vitronics, 90 F.3d at 1585). Phillips reaffirmed that dictionary definitions may appropriately be relied upon in claim construction “so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents.” Id. at 1322-23 (quoting Vitronics, 90 F.3d at 1584 n.6).

Although ATMI contends that the district court’s claim construction is inconsistent with the specification of the ’609 patent because the district court did not require that the capillaries be uniform, we conclude that there is no inconsistency. ATMI relies on two aspects of the specification. First, ATMI quotes a statement identifying providing

uniform capillary passages as one object of the invention. '609 patent col.3 ll.40-43.<sup>13</sup> However, it is generally not appropriate “to limit claim language to exclude particular devices because they do not serve a perceived ‘purpose’ of the invention. . . . An invention may possess a number of advantages or purposes, and there is no requirement that every claim directed to that invention be limited to encompass all of them.” E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1370 (Fed. Cir. 2003) (citation and footnote omitted); see also Howmedica Osteonics Corp. v. Wright Med. Tech., Inc., No. 2007-1363, 2008 WL 4072052, at \*6 (Fed. Cir. Sept. 2, 2008) (quoting and applying E-Pass). The language here does not suggest that each embodiment of the invention must serve the uniformity objective.

Second, ATMI relies on language in the specification describing the capillaries as uniform. (See Cross-Appellant’s Br. 69-70 (citing '609 patent col.3 ll.40-43, col.3 ll.54-56, col.4 ll.22-31, col.4 l.66-col.5 l.17, col.5 ll.54-55, col.6 ll.56-58, col.7 ll.27-29, col.7 ll.37-40)). But nearly all of the parts of the specification that discuss uniform capillaries cover only specific embodiments of the invention of the '609 patent and not the invention as a whole. As such, these parts of the specification are not properly construed as limiting the meaning of the claim language. Computer Docking Station Corp. v. Dell, Inc., 519 F.3d 1366, 1374 (Fed. Cir. 2007).

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<sup>13</sup> The language relied upon by ATMI in this regard is as follows:

It is a further object of this invention to provide a multi-passage capillary assembly that provides a high degree of uniformity in the individual cross sections of the multiple capillaries and has an outer cross section of the assembly that is compatible with the necessary fittings for sealing fluid flow through the capillary passages.”

'609 patent col.3 ll.40-45.

The exception is statements such as the language in the Summary of the Invention section of the '609 specification that “[t]he apparatus of this invention provides a flow restrictor in the storage container in the form of a tube having multiple uniformly shaped capillaries . . . .” ’609 patent col.3 ll.54-56. A somewhat similar statement appears in the Detailed Description of the Preferred Embodiments. See id. col.7 ll.27-29 (“A useful feature of this invention is the provision of the essentially round outer cross section of the tube with the relatively uniform internal capillary passages.”); see also id. col.9 l.66-col.10 l.9 (“A number of other forming techniques and material properties can be important to obtaining a uniform multi-capillary structure. . . . Uniformity of the resulting capillaries also improves as the alignment of the conduits in the drawing stock becomes more parallel.”).

Although these statements appear to pertain to the invention overall, rather than a specific embodiment of the invention, they are contradicted by a number of express statements in the '609 specification clearly indicating that uniformity of the capillary tubes is a feature only of certain embodiments, and not of all embodiments, of the invention. The Summary of the Invention states “in a limited apparatus embodiment this invention is an apparatus for controlling the discharge of pressurized fluids . . . . The apparatus comprises . . . [a] tube defining multiple and uniformly sized capillary passages . . . .” Id. col.4 l.66-col.5 l.17 (emphasis added). Another passage from the Summary of the Invention confirms this understanding, describing capillary uniformity as an aspect of “a broad embodiment [of] this invention”. Id. col.4 ll.22-34 (emphasis added). Likewise, the Detailed Description of the Preferred Embodiments section of the specification explains that “[t]he preferred structure of this invention is a uniform multi-

capillary assembly that virtually eliminates the presence of irregular capillaries. . . . The most preferred form of this structure eliminates all irregular capillaries.” ’609 patent col.7 ll.29-61 (emphases added).

Finally, the structure of the claims confirms that uniformity was not intended to be a feature of the invention as a whole. The specification expressly defines the uniformity of different uniform capillary passages as a “variation in average diameter between capillaries not exceeding 15%.” Id. col.7 ll.37-40. While no mention of uniformity appears in independent claim 1, the uniformity criterion defined in the specification — “variation in diameter of different capillary passages does not exceed 15%” — is set forth in dependent claim 4. Id. col.11 ll.25-28. It therefore appears that the uniformity requirement, as set forth in the specification, was intended to be added by dependent claim 4, and was not already present in independent claim 1 or the invention overall.

Recently in Voda v. Cordis Corp., 536 F.3d 1311, 1320-21 (Fed. Cir. 2008), this court refused to read references in the written description that described the contact portion of a guide catheter as “providing a straight portion” in its rest state as limiting because “other portions of the written description . . . discuss the contact portion [of the guide catheter] without requiring that it be straight in its rest state.” Here, we cannot read the references to capillary uniformity that might otherwise suggest that uniformity is a feature of the invention as a whole as overriding these clear teachings that capillary uniformity is a feature of only certain embodiments of the invention.

Accordingly, we decline to construe uniformity as a requirement of the term “capillary” as used in the asserted claims of the ’609 patent, and we affirm the district

court's construction of the term "capillary" to mean "pertaining to or resembling a hair; fine and slender."

## B. Anticipation

ATMI also urges that the district court erred in denying judgment as a matter of law that the asserted claims of the '609 patent were invalid. It urges that those claims are anticipated by the Zheng patent.

"Anticipation . . . requires 'the presence in a single prior art disclosure of all elements of a claimed invention arranged as in that claim.'" Sandt Tech., Ltd. v. Resco Metal & Plastics Corp., 264 F.3d 1344, 1350 (Fed. Cir. 2001) (quoting Carella v. Starlight Archery & Pro Line Co., 804 F.2d 135, 138 (Fed. Cir. 1998)). The party asserting invalidity due to anticipation must prove anticipation by clear and convincing evidence, and a jury's verdict of anticipation is reviewed for substantial evidence. Yoon Ja Kim v. ConAgra Foods, Inc., 465 F.3d 1312, 1324 (Fed. Cir. 2006). In reviewing a jury verdict on the issue of anticipation, the question of what a reference disclosed is a question of fact. Id.

We conclude that substantial evidence supports the jury's verdict of no invalidity. ATMI correctly notes that the Zheng patent disclosed gas delivery systems that include sintered metal filters. However, the mere fact that Zheng disclosed sintered metal filters does not mean that the disclosed filters contain capillary tubes. A critical aspect of this anticipation dispute, upon which the parties' arguments to the jury focused, was whether ATMI had established that the sintered metal filters taught in the Zheng patent

contained capillary tubes, as required by the asserted claims of the '609 patent.<sup>14</sup> Praxair appropriately relied upon the presumption of validity in making its argument that Zheng did not anticipate the '609 patent. The only contrary evidence that the Zheng filters contained capillaries was the testimony of ATMI's expert, Dr. Glew, that the sintered metal filters described in the Zheng patent and those used in the '609 patent were so similar that if one contained capillaries, the other also contained capillaries. However, the jury was not required to accept Glew's opinion.

Relying on this same testimony, ATMI effectively urges that a new trial is required because the jury's verdicts as to the issues of validity and infringement of the

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<sup>14</sup> Asserted claims 1, 2, 6, 7, and 8 of the '609 patent each depend on claim 1, which as discussed above, requires, among other things, "a flow restrictor in the form of a tube defining multiple capillary passages along at least a portion of the fluid flow path." '609 patent col.11 ll.15-17. In full, the asserted claims of the '609 patent are as follows:

1. An apparatus for controlling the discharge of pressurized fluids from the outlet of a container, the apparatus comprising:
  - a container for holding a pressurized fluid in an at least partial gas phase;
  - an outlet port for delivering pressurized fluid from the container;
  - a fluid flow path defined at least in part by the outlet port for delivering pressurized fluid from the container; and,
  - a flow restrictor in the form of a tube defining multiple capillary passages along at least a portion of the fluid flow path.
2. The apparatus of claim 1 wherein the flow restrictor defines at least seven capillary passages.
  - . . . .
6. The apparatus of claim 1 wherein the tube is located within the container.
7. The apparatus of claim 6 wherein the tube defines an inlet located at about the axial midpoint of the container.
8. The apparatus of claim 7 wherein the tube locates the inlet at about the radial midpoint of the container.

'609 patent col.11 ll.5-40.

'609 patent are inconsistent with one another.<sup>15</sup> ATMI argues that because, in finding infringement, the jury necessarily found that the sintered metal filters in ATMI's VAC products include capillary passages within the meaning of the '609 patent, it was inconsistent for the jury to reject ATMI's argument that the similar sintered metal filters taught in the Zheng patent also include capillary passages. The sole basis for this argument is the previously described testimony of ATMI's witness, Glew, and as we have noted, the jury was not required to accept Glew's opinion.

Finally, ATMI asserts that during Praxair's closing argument to the jury Praxair's counsel improperly stated as a fact that the Zheng filters do not have capillaries.<sup>16</sup> No

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<sup>15</sup> At most, such an inconsistency could result only in a new trial, not entry of judgment of invalidity as a matter of law. See, e.g., Mosley v. Wilson, 102 F.3d 85, 88-91 (3d Cir. 1996); Gordon v. Degelmann, 29 F.3d 295, 298-99 (7th Cir. 1994) ("There is no priority among inconsistent verdicts. If the problem is not caught before the jury disbands . . . , the proper thing to do is to hold a new trial with respect to all affected parties."); see also 9B Charles Alan Wright & Arthur R. Miller, Federal Practice & Procedure § 2504.1 (3d ed. 2008).

<sup>16</sup> The passage from Praxair's closing argument relied upon by ATMI for this proposition was as follows:

Now, recall Dr. Glew's testimony on this point. He refused to testify definitively that the Zheng patents teaches a flow restrictor or a capillary. ATMI called Dr. Glew to the witness stand as a technical expert, but all he offered you was semantic argument. He refused to take a position.

According to Dr. Glew, if the VAC product, if the VAC product has a flow restrictor and capillaries, then Zheng must have those features as well. That's not science. That's argument. And it's also not so.

Dr. Glew presented no technical basis to support his argument. All he presented to you was words.

Dr. Glew's argument does not prove invalidity, especially by clear and convincing evidence.

objection to this testimony was made at the time, and accordingly, we review this alleged impropriety for plain error. See Dunn v. HOVIC, 1 F.3d 1371, 1377 (3d Cir. 1993). The argument that these comments, which merely pointed out a lack of evidence, constituted plain error is frivolous. We conclude that the district court properly rejected ATMI's motion for a new trial or for judgment as a matter of law of invalidity of the '609 patent.<sup>17</sup>

### CONCLUSION

We dismiss ATMI's cross appeal in no. 2007-1509. As to Praxair's appeal, we affirm the district court's conclusion that the '115 patent is unenforceable due to inequitable conduct. We reverse the district court's conclusion of unenforceability with regard to the '609 patent. We affirm the district court's determination that the '609 patent was not proven invalid, and vacate the determination that the '609 patent was infringed.<sup>18</sup> Accordingly, we remand to the district court for determination of

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You could read the Zheng patent until the end of time and you would not find anything about capillaries. The word does not appear there.

J.A. at 9101.

<sup>17</sup> ATMI asserts that Praxair failed to present record evidence to establish that the accused VAC products include capillaries. ATMI's argument in this regard is without merit. Praxair introduced at trial sufficient evidence to allow a reasonable juror to conclude that the VAC products contain capillaries as that term was construed by the district court. Among other evidence, ATMI presented optical and scanning electron microscope images of the sintered filters used in the VAC products that were admitted at trial along with expert testimony by Praxair's expert, Dr. Karvelis who testified that based on microscope images and a fluid uptake test (a video of which was presented to the jury) that the accused filters necessarily contained long, narrow capillary passages.

<sup>18</sup> Praxair asserts that the district court should have granted a permanent injunction against future infringement. However, as discussed above, during the pendency of this appeal, the parties have advised us that they have reached an agreement whereby Praxair will not seek an injunction against ATMI. Therefore, we do not address this issue.

infringement as to the '609 patent under the correct claim construction. Finally, we reverse the district court's judgment of invalidity of the '895 patent based on indefiniteness, and remand to the district court for further proceedings consistent with this opinion as to Praxair's allegations of infringement of the '895 patent.

As to appeal no. 2007-1483:

AFFIRMED-IN-PART, REVERSED-IN-PART, and REMANDED

As to appeal no. 2007-1509:

DISMISSED

COSTS

No costs.

# United States Court of Appeals for the Federal Circuit

2007-1483, -1509

PRAXAIR, INC.  
and PRAXAIR TECHNOLOGY INC.,

Plaintiffs-Appellants,

v.

ATMI, INC.  
and ADVANCED TECHNOLOGY MATERIALS, INC.,

Defendants-Cross Appellants.

Appeals from the United States District Court for the District of Delaware in case no. 03-CV-1158, Judge Sue L. Robinson.

LOURIE, Circuit Judge, concurring in part and dissenting in part.

I join the majority in all respects, except for its affirmance of the holding of inequitable conduct regarding the '115 patent. I respectfully dissent from that conclusion.

The district court found that the RFO prior art was material and not cumulative of what had been disclosed to the PTO. Praxair, Inc. v. ATMI, Inc., 489 F. Supp. 2d 387, 393-94 (D. Del. 2007). But its opinion indicates no evidence of intent to deceive by the inventors or their attorney. The court justified its inference of intent by indicating that RFOs were well known in the art and were used by Praxair prior to the filing of the patents that were held unenforceable. Id. at 395. The court noted that there was no evidence that the inventors or their attorney disclosed that art to the PTO, and that they offered no explanation for that omission. Id. The court then stated that “[i]n view of the

high materiality of the RFO art withheld from the PTO and the absence of any explanation for the nondisclosure, an intent to deceive may be properly inferred in this case.” Id. The court cited Bruno Independent Living Aids, Inc. v. Acorn Mobility Services, Ltd., 394 F.3d 1348 (Fed. Cir. 2005), for the proposition that an inference of deceptive intent may be inferred in view of the high materiality of the omitted prior art. Praxair, 489 F. Supp. 2d at 395.

I believe the district court incorrectly conflated intent with materiality. It cited no evidence of intent to deceive. Non-citation of a reference does not necessarily justify an inference of intent to deceive. See M. Eagles Tool Warehouse, Inc. v. Fisher Tooling Co., 439 F.3d 1335, 1342-43 (Fed. Cir. 2006) (finding a lack of good faith explanation of nondisclosure insufficient to infer intent to deceive the PTO). Bruno involved more egregious facts than appear here, in particular, in that case a reference was cited to the FDA, but not to the PTO. See id. Thus, intent was inferable because a decision was made that the reference was important to the FDA’s consideration and a contrary decision must have been made with respect to the PTO. Clearly, the omission in Bruno may be inferred to have been not inadvertent.

While a smoking gun may not be needed to show an intent to deceive, more is needed than materiality of a reference. The district court did not find anything further here. In addition, the court did not engage in any balancing of materiality and intent as is required by our precedent. N.V. Akzo v. E.I. DuPont de Nemours, 810 F.2d 1148, 1153 (Fed. Cir. 1987).

Furthermore, the court did not make findings of knowledge of materiality sufficient for an inference of intent to deceive. The court found, and the majority now

affirms, that Tolomei and LeFebre “had knowledge” of the RFO art. Praxair, Inc. v. ATMI, Inc., 489 F. Supp. 2d at 395. However, that finding is insufficient. An inference of intent to deceive requires more than knowledge of the existence of the nondisclosed art; it also requires a finding that the applicant knew, or should have known, of the materiality of that art. Ferring B.V. v. Barr Labs., Inc., 437 F.3d 1181, 1191 (Fed. Cir. 2006) (citing Bruno, 394 F.3d at 1354; Critikon, Inc. v. Becton Dickinson Vascular Access, Inc., 120 F.3d 1253, 1257 (Fed. Cir. 1997)). The court made no mention of either attorney’s knowledge of the materiality of the RFO art, and no evidence of record demonstrates that they knew of the materiality of the RFO art. The majority states that “Tolomei at least was aware of its obvious materiality in light of” the four statements made by Tolomei to the PTO during prosecution. That conclusion, however, is not supported by any finding of the district court.

Finally, I agree with the majority that, on the basis of the settlement agreement between the parties, we need not consider the district court’s denial of the request for a permanent injunction. However, I do question the high burden that the court set in reaching its conclusion.

The Supreme Court, in eBay, did not rule out entitlement to a permanent injunction when one competitor in a two-party market has been found to infringe a patent of another competitor. eBay Inc. v. MercExchange, LLC, 547 U.S. 388, 394 (2006) (“[W]e take no position on whether permanent injunctive relief should or should not issue in this particular case, or indeed in any number of other disputes arising under the Patent Act.”). It held only that the traditional four-factor test should be applied. Id. The district court here seemed to be impressed with the fact that both companies were

large companies with substantial revenues, and that the infringing materials constituted a small portion of those revenues, implying that the patentee would not be sufficiently harmed by the denial of the injunction. Praxair, Inc. v. ATMI, Inc., 479 F. Supp. 2d 440, 443-44 (D. Del. 2007). However, it is important to recognize that a patent provides a right to exclude infringing competitors, regardless of the proportion that the infringing goods bear to a patentee's total business. Therefore, provided the four-factor test has been met, a patentee should be able to exclude competitors who sell only a small amount of an infringing product or competitors whose sales of an infringing product constitute only a small portion of its sales or of the patentee's sales. Otherwise, the patent right becomes devalued.

Thus, I dissent from the majority's affirmance of the holding of inequitable conduct with respect to the '115 patent.