

United States District Court,
E.D. Virginia, Norfolk Division.

CALMAC MANUFACTURING CORPORATION,
Plaintiff.

v.

DUNHAM-BUSH, INC., and Lake Taylor City Hospital Authority, also known as Hospital Authority of Norfolk, trading as Lake Taylor Hospital,
Defendants.

Civil Action No. 2:95cv825

June 21, 1996.

Holder of patent for thermal storage device sued alleged infringer. Alleged infringer moved for summary judgment. The District Court, Rebecca Beach Smith, J., held that: (1) patentee was estopped from bringing infringement action by joint press release in which parties had agreed that accused device did not infringe patent, and (2) accused device did not infringe patent, either literally or under doctrine of equivalents.

Motion for summary judgment granted.

4,294,078. Not infringed.

Jane D. Tucker, Vandeventer, Black, Meredith & Martin, Norfolk, VA, Charles J. Brown, Brown, Kelleher, Zwickel & Wilhelm, Windham, NY, for Plaintiff.

Stephen E. Noona, Kaufman & Canoles, Norfolk, VA, Neil B. Siegel, William H. Mandir, Sughrue, Mion, Zinn, Macpeak & Seas, Washington, DC, for Defendants.

OPINION AND ORDER

REBECCA BEACH SMITH, District Judge.

This dispute involves the alleged infringement of a patented thermal storage device. It is before the court for resolution of defendant Dunham-Bush's two motions for summary judgment. For the reasons which follow, the court finds persuasive both arguments raised by the motions and, therefore, **GRANTS** summary judgment on both grounds and dismisses the action against Lake Taylor City Hospital Authority.

I. Factual and Procedural History

Plaintiff, Calmac Manufacturing, Corp. ("Calmac"), is a manufacturer of a patented thermal storage device named the ICE-BANK. Such devices are used to store thermal energy. They are frequently employed by

large air conditioning systems, which cool the devices at night, when energy is cheaper, and then draw the stored "coolness" off during the day to air condition buildings.

The ICE-BANK was invented by Calmac founder, Calvin MacCracken, and issued patent number 4,294,078 ("the '078 patent") on October 13, 1981. Calmac is a family business, now run by Calvin MacCracken's son, Mark MacCracken. Dunham-Bush, Inc. ("DB") markets a similar thermal storage device called the ICE-CEL. On June 13, 1995, DB was issued patent number 5,423,378 ("the '378 patent") for the ICE-CEL.

Both products utilize a system of spiraling tubes in a cylindrical chamber to transfer thermal energy by alternately freezing and melting a phase change material. The ICE-BANK uses lengths of side-by-side tubing joined at the end by a U-joint. This configuration results in the fluid flowing in one tube, reversing at the U-joint, and flowing out of the adjacent tube. The ICE-CEL uses a series of flat, coiled pairs of tubes. In each pair, the first tube spirals in from the outside and the second tube spirals out from the inside. The result of this design is that the fluid flows in the same direction in each tube. When cooling the tank, however, the vertically adjacent tubes have the coldest fluid entering from different points in the tank, resulting in the same "thermal averaging" effect which the ICE-BANK achieves by virtue of its dual-tube configuration.

The similarity in construction between the two devices was apparent prior to the issuance of the ICE-CEL's '378 patent. FN1 The present controversy arose at a trade show in January, 1994, where DB was exhibiting the ICE-CEL. After examining the scale model of the ICE-CEL on exhibit at the show, the MacCrackens expressed concern that the new device infringed on their '078 patent. Dunham-Bush engineers explained that the scale model was not constructed precisely like the full-size ICE-CEL due to space limitations. In an effort to resolve the concerns over the design similarities, DB invited Calvin MacCracken to visit the DB manufacturing facility to examine a full-sized prototype of the ICE-CEL. Although Mark MacCracken expressed an interest in accompanying his seventy-four year old father, his request was denied, and only the senior MacCracken visited the Harrisonburg, Virginia, facility.

FN1. The court remains puzzled that the present dispute was not fully aired before the patent board when DB sought patent protection for the ICE-CEL, as the facts were well-established prior to its issuance.

Mr. MacCracken visited the plant, and was shown the prototype by DB's chief engineer, and inventor of the ICE-CEL, Warren Dillenbeck. Mr. Dillenbeck explained the construction of the device, and the two men examined it together. In an effort to explain how the ICE-CEL operated, Mr. Dillenbeck drew a sketch of the tube structure, using different colored ink to illustrate the different layers of tubing. After the meeting, on May 12, 1994, Calvin MacCracken wrote a letter memorializing his understanding of the ICE-CEL design, acknowledging that it did not infringe the '078 patent, and urging that the two companies publicly announce their resolution of the controversy.

During the next month, the parties exchanged several letters and draft press releases, culminating in their joint public announcement that the dispute had been resolved and that the new device (ICE-CEL) did not infringe the '078 patent (ICE-BANK). The agreement was announced by a release mailed to the trade press on June 6, 1994. After the announcement and the issuance of the '378 patent for the ICE-CEL, DB began manufacturing the unit and seeking sales.

Concurrent with its negotiations with Calmac concerning the infringement issue, DB was also negotiating

with a buyer to purchase the unit of the company which manufactured the ICE-CEL. As a part of this negotiation, DB's Vice President, Richard O'Connell, was asked to prepare a Litigation Schedule, listing all pending and threatened lawsuits against the company. As a result of DB's recent agreement with Calmac, the list did not include any mention of the dispute over the '078 patent. The purchase closed, and the new owners retained both Mr. O'Connell and Mr. Dillenbeck.

After the purchase, and despite its public pronouncement to the contrary, Calmac filed this action on August 8, 1995, alleging that the ICE-CEL infringed on the '078 patent. The complaint named as defendants DB and the Lake Taylor City Hospital Authority, a DB client which had purchased an ICE-CEL. Calmac now claims that Calvin MacCracken was misled on his visit to the DB plant and that he did not understand precisely how the new system worked when he agreed that it did not infringe upon Calmac's patent. Complicating the case, the senior Mr. MacCracken has since been diagnosed with Alzheimer's dementia and is unable at this time to testify competently about the meeting in May, 1994, or his resulting understanding of the ICE-CEL system. FN2

FN2. Neither party claims, however, that Calvin MacCracken was incompetent at the time of the May, 1994, meeting or the joint press release on June 6, 1994.

Dunham-Bush answered the complaint and filed a counterclaim alleging abuse of process. It alleges that Calmac brought this suit to scare away DB's customers for the ICE-CEL. Calmac moved to dismiss the counterclaim. On April 2, 1996, the court denied that motion, ruling that dismissal was premature because it was possible that DB could maintain an action for abuse of process on the facts alleged.

On April 18, 1996, DB filed its first motion for summary judgment along with a supporting memorandum. Dunham-Bush asserts that Calmac is estopped from bringing this action as a result of the site visit by Calvin MacCracken and subsequent joint press release announcing the non-infringement. Calmac responded to this motion with a brief and supporting affidavits on April 30, 1996. Dunham-Bush filed a reply brief and additional materials on May 3, 1996.

On April 23, 1996, DB filed a second motion for summary judgment. In this motion, DB asserts that the ICE-CEL does not infringe upon the '078 patent because the two units operate differently in key ways. Calmac opposed this motion by memorandum and affidavit on May 7, 1996. Dunham-Bush filed a reply memorandum on May 9, 1996. The court heard oral argument on both motions, and the matter is now ready for decision.

II. Analysis

A. Summary Judgment Standard of Review

Summary judgment is appropriate only when the court, viewing the record as a whole and in the light most favorable to the nonmoving party, finds no genuine issue of material fact and that the moving party is entitled to judgment as a matter of law. Fed.R.Civ.P. 56; *see, e.g.*, *Celotex Corp. v. Catrett*, 477 U.S. 317, 322-24, 106 S.Ct. 2548, 2552-53, 91 L.Ed.2d 265 (1986); *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248-50, 106 S.Ct. 2505, 2510-11, 91 L.Ed.2d 202 (1986); *Terry's Floor Fashions, Inc. v. Burlington Indus., Inc.*, 763 F.2d 604, 610 (4th Cir.1985). Once a party has properly filed evidence supporting the motion for summary judgment, the nonmoving party may not rest upon mere allegations in the pleadings, but must instead set forth specific facts illustrating genuine issues for trial. *Celotex Corp.*, 477 U.S. at 322-24, 106

S.Ct. at 2552-53. Such facts must be presented in the form of exhibits and sworn affidavits. "[T]he plain language of Rule 56(c) mandates the entry of summary judgment ... against a party who fails to make a showing sufficient to establish the existence of an element essential to that party's case, and on which that party will bear the burden of proof at trial." *Id.* at 322, 106 S.Ct. at 2552.

B. Equitable Estoppel

Dunham-Bush argues that Calmac is equitably estopped from bringing this suit as a result of Calvin MacCracken's inspection of the ICE-CEL and the subsequent joint press release acknowledging that there was no infringement of the '078 patent. Calmac argues that there is no estoppel because Calvin MacCracken was misled about the true nature of the ICE-CEL system. Calmac further argues that DB knew Mr. MacCracken did not understand how the new system operated when Calmac agreed to the joint press release. According to Calmac, DB could not rely on that press release, either because it knew Mr. MacCracken was mistaken in his belief that there was no infringement or because DB deliberately misled Calmac about the true nature of the ICE-CEL design.

[1] [2] [3] [4] Where an alleged infringer establishes the defense of equitable estoppel, the patentee's claim may be entirely barred. *Adelberg Laboratories, Inc. v. Miles, Inc.*, 921 F.2d 1267, 1272 (Fed.Cir.1990). The Federal Circuit, in an en banc opinion, recently articulated the standards governing the defense of equitable estoppel under the patent laws. *A.C. Aukerman Co. v. R.L. Chaides Const. Co.*, 960 F.2d 1020, 1028 (Fed.Cir.1992). Pursuant to *Aukerman*, three elements must be established to bar a patentee's suit by reason of equitable estoppel:

a. The patentee through misleading conduct, leads the alleged infringer to reasonably infer that the patentee does not intend to enforce its patent against the alleged infringer. "Conduct" may include specific statements, action, inaction, or silence where there is an obligation to speak.

b. The alleged infringer relies on that conduct.

c. Due to its reliance, the alleged infringer will be materially prejudiced if the patentee is allowed to proceed with its claim.

Id. at 1028. As an equitable defense, estoppel is committed to the sound discretion of the trial judge. *Id.* In addition to the three factors, the trial court must take into consideration other equities between the parties in deciding whether to apply the equitable defense of estoppel. *Id.* at 1043. Finally, the Federal Circuit, after reviewing the different burdens of proof applicable in state courts, held that in patent cases, proof of the three factors by a preponderance of the evidence is sufficient. *Id.* at 1044-46.

The parties disagree about whether a representation based on mistake can form the basis of the misleading conduct. Calmac, citing a legal treatise, argues that conduct or a representation based upon mistake cannot give rise to an estoppel defense. 28 Am.Jur.2d, Estoppel and Waiver, s. 44. As DB points out, however, this same section continues: "On the other hand, one who has deliberately and intentionally so conducted himself, or made such representations, as to induce reasonable men at his instance to act in reliance thereon ... will not be permitted to deny the truth of such representations ... regardless of how much mistaken in fact he may have been." *Id.*

[5] [6] [7] Thus, if Mr. MacCracken was in fact innocently mistaken about the way the new device worked,

this will not defeat the estoppel defense because he made an express representation which was intended to, and did cause reliance by DB. However, if the court finds that DB, through Mr. O'Connell or any other agent, *knew* that Mr. MacCracken was mistaken, or that DB deliberately misled him in order to obtain the joint press release, then DB's own misrepresentation would defeat its right to equitable relief. Applying these legal standards to the undisputed facts before the court, it is plain that DB is entitled to the estoppel defense.

Two elements are not contradicted in the record. First, unquestionably DB relied on the joint press release in closing its sale and pursuing the marketing of the ICE-CEL system. In addition, no party contests that the litigation and threat of injunction against further sales of the ICE-CEL will prejudice the new owners of DB who are defendants in this action. Because the threat was not disclosed on the Litigation Schedule prepared prior to the company's sale, no agreement or price reduction was obtained as a result of the potential infringement. Therefore, DB's entitlement to the estoppel defense turns on the parties' conduct prior to issuing the joint press release.

The evidence related to this announcement is not in dispute. Viewing this evidence in the light most favorable to Calmac, as the non-moving party, the court is nevertheless unable to conclude that DB misled Mr. MacCracken during his visit to the Harrisonburg production facility. Moreover, there is no indication that Mr. MacCracken *was* mistaken in his understanding of the ICE-CEL design when the press release issued, much less that DB knew he was mistaken.

To begin with, there is no dispute that at the time he visited the DB facility, Calvin MacCracken was the person best equipped to evaluate the new device and determine whether there was infringement. Dep. of Mark MacCracken, vol. VI, at 11. Indeed, the senior Mr. MacCracken is something of a legend in the field, holding more than eighty patents and a position in the New Jersey Inventors' Hall of Fame. Calmac Ex. B. It is also clear that DB's Mr. Dillenbeck made every effort to explain fully the new system. Describing the examination of the tank with Mr. MacCracken which took place in May, 1994, Mr. Dillenbeck testified:

When you are looking down in that tank, what you see mostly is the top pancake [of coil]. What you can see, of course, is the headers, you can easily see the connections to the headers, and you can trace, for example the radial connector to the second pancake, as well as the first. And all that stuff I did trace out for Mr. MacCracken. And I pointed out to him how the circuitry worked for the top pancake and the second one.

Dillenbeck Dep. at 246-47.

Mr. Dillenbeck further testified that, after their discussion, Mr. MacCracken made up his mind quickly:

I had gone to great lengths to try to make sure that he understood what he was looking at. I wanted there to be no doubt in his mind what he was looking at. I didn't want any confusion. And so I went over this in great detail with him. And I expected that he might take more time and question me further and so on.... And in what is a surprisingly short period of time, he seemed to grasp what the configuration was and satisfy himself about that. And then he said, "You are not violating my patent."

Dillenbeck Dep. at 251. In addition, Mr. Dillenbeck's three-color drawing of the device provided to Mr. MacCracken during the May, 1994, visit clearly illustrates the paired coil construction and the different origination points of each tube in the pair. Dillenbeck Aff. para. 13, Ex. 1. In short, there is not a single

piece of evidence indicating that DB acted other than forthrightly during Mr. MacCracken's inspection visit.

In the absence of such evidence, Calmac resorts to conjecture. It points out, for example, that Mr. MacCracken was shown only a prototype ICE-CEL, with the lid only partially removed. But the undisputed evidence indicates that the prototype was exactly the same as the production model and that Mr. MacCracken had every opportunity to thoroughly examine the tank while at the DB facility. Furthermore, it was Mr. MacCracken who first proposed, in his May 12 letter, that the two companies issue a joint announcement regarding the non-infringement. He was under no obligation to make such a public representation, and had there been any uncertainty about his treatment at DB, it was certainly in his interest not to publicly exonerate the company before thousands of his potential customers.

In addition to the complete absence of evidence on Calmac's deception theory, there has been no true showing that Mr. MacCracken was, in fact, mistaken about the way the ICE-CEL operated. Calmac argues that Calvin MacCracken's May 12 letter, summarizing his understanding of the device, is proof that he did not understand its true operation. It claims that the letter put DB on notice of Mr. MacCracken's misunderstanding and invited it to correct any mistake. Among the eight points enumerated in the letter, the relevant passage states:

Just to summarize our agreements, I'd like to list the points we discussed and would appreciate any input you have:

1) Your ice tanks will have heat exchanger tubes which only spiral in a clockwise or a counterclockwise wrap, but not both. In other words, the tubes spiral in from the inlet header but cross out to the outlet header without again spiraling, as in FIG. 1 of the U.K. patent No. 2,017,895 to Welsby. This appears to avoid patent infringement of the CALMAC tanks.

Calmac Ex. F.

Dunham-Bush, by letter from Mr. O'Connell dated May 17, 1994, responded to Mr. MacCracken's May 12 letter stating the company could agree with two of his eight points.

That is, that the design of the Dunham Bush ICE-CEL ice storage system does *not* infringe on Calmac's U.S. Patent No. 4,294,078 and that a mutually agreed upon industry announcement acknowledging the non-infringement would be valuable to both parties....

Calmac Ex. O. Thus, the letter in response agrees with Mr. MacCracken's May 12 letter to the extent it "acknowledg[es] the non-infringement," but it does not address the remainder of Mr. MacCracken's first point, concerning his understanding of the tube arrangement in the ICE-CEL system, or his request for "input." Notwithstanding Mr. O'Connell's failure to address specifically this point in Mr. MacCracken's letter, the subsequent communications between the two companies made clear to Calvin MacCracken that the new tank would operate in a fashion similar to the Calmac ICE-BANK.

The May 12 letter merely initiated the parties' negotiation of an agreed statement to the trade press. Follow-up correspondence between Mr. O'Connell and Calvin MacCracken reveals that, before agreeing to the press release, Mr. MacCracken knew that the new device achieved "thermal averaging" and relatively consistent freeze and melt temperatures throughout the tank just as the Calmac tank did. This is evident from a language change proposed by Mr. O'Connell. Calmac had proposed a sentence in the release which read, in

part:

freezing and thawing in the Dunham Bush tank proceeds from the outside to the inside of the tank, and not uniformly throughout the tank as in CALMAC's system.

DB Reply Mem.Ex. 4. Mr. O'Connell responded by letter dated June 1, 1994, which stated:

It is the position of Warren Dillenbeck and Dunham-Bush, Inc. that the ICE-CEL design achieves thermal averaging equally as well as the Calmac ICE-BANK and so, therefore, we cannot agree to the statements regarding the absence of freezing and melting at relatively constant temperatures or uniformity throughout the tank.

DB Reply Mem.Ex. 5.

This correspondence made clear to Calvin MacCracken exactly how the ICE-CEL operated. Moreover, it is undisputed that the Welsby patent, referenced in point one of Mr. MacCracken's May 12 letter, did not achieve thermal averaging or uniform freezing and melting throughout the tank. Thus, Mr. MacCracken must have known at the time the press release issued that the ICE-CEL operated differently from the Welsby design.

Calmac, ignoring this follow-up correspondence, focuses solely on the May 12 letter. It argues that the letter was carefully crafted by Mr. MacCracken in consultation with his son and Calmac's patent attorney to best express Mr. MacCracken's understanding of the device and to invite correction. FN3 In its brief, and at oral argument, Calmac's counsel theorized that Mr. O'Connell deliberately withheld the May 12 letter from the ICE-CEL inventor, Mr. Dillenbeck, and purposefully skirted Mr. MacCracken's description of the ICE-CEL design in point one to avoid the infringement problem which might jeopardize the company's sale. This hypothesis is contradicted by the evidence. Mr. O'Connell testified that he recalled discussing the letter with Mr. Dillenbeck and that he "believed he faxed him a copy of it." O'Connell Dep., vol. II, at 230. Mr. Dillenbeck, although he lacked specific recall of the document, testified that he "may have actually been copied on this document" or that Mr. O'Connell "may have summarized it to me over the telephone." Dep. of W. Dillenbeck at 260. In any case, Mr. Dillenbeck thought Mr. MacCracken's description of the design in point one of the letter was "a fair representation of the product, in that we emphasized to Cal when he was there that flow was in a consistently clockwise fashion, say, in all layers." Dillenbeck Dep. at 261. Mr. Dillenbeck's deposition reflects his apparent understanding that Calvin MacCracken was referring to the *flow of the liquid* in the tubes and not the tube wrapping itself. This view is entirely consistent with Mr. MacCracken's original objections to the device, which he believed utilized a counterflow of liquid in the adjacent tubes.

FN3. Calmac submits a letter from its patent attorney revealing that significant portions of the May 12 letter were drafted by the attorney. Calmac Ex. G. It is worth noting that the attorney had never seen the new device prior to writing the descriptive language, and it is unclear how the additional passage clarified Mr. MacCracken's own understanding of the ICE-CEL design.

To summarize, there is no evidence that DB attempted to or did mislead Calvin MacCracken during his visit to the DB plant. Upon his return, it was Mr. MacCracken who suggested the press release announcing resolution of the patent dispute. The undisputed evidence in the record also compels the conclusion that Mr.

MacCracken did so with a complete understanding of the ICE-CEL's operation, at least as it pertained to his patent. Even if he did not completely understand the innovative design conceived by Mr. Dillenbeck to achieve thermal averaging without counterflow in adjacent tubes, there is no evidence that DB was aware of his misunderstanding. Accordingly, DB was fully justified in relying on the joint press release when it closed the sale of the business and began marketing the ICE-CEL system.

Therefore, Calmac is estopped from bringing this action against DB or its ICE-CEL clients. Accordingly, DB's motion for summary judgment on this ground is **GRANTED** and the action is **DISMISSED** as to defendant Lake Taylor City Hospital Authority.

C. Non-Infringement

In its second motion for summary judgment, DB first argues that the uncontested facts show that it did not literally infringe upon claim 16 of Calmac's '078 patent. In support of this argument, DB notes several critical differences between claim 16 and the ICE-CEL. Next, DB argues that Calmac is precluded by prosecution history estoppel from asserting the doctrine of equivalents. In response, Calmac contends that material issues of fact regarding the doctrine of equivalents and prosecution history estoppel remain for the trier of fact to determine. The court finds that DB is entitled to summary judgment on the infringement issue.

1. Legal Discussion of Patent Infringement

[8] [9] [10] [11] To prevail on a claim of patent infringement, the patentee must prove infringement by a preponderance of the evidence. *E.g.*, *Bush Industries, Inc. v. O'Sullivan Industries, Inc.*, 772 F.Supp. 1442, 1449 (D.Del.1991). Infringement of a patent is determined in a two-step process. *Carroll Touch, Inc. v. Electro Mechanical Systems, Inc.*, 15 F.3d 1573, 1576 (Fed.Cir.1993). First, the court must construe the claim to determine its proper scope and meaning. *Id.* Second, the trier of fact must compare the properly construed claim to the accused device to determine whether there has been an infringement, either literal or equivalent. *Id.* The first step is a question of law. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed.Cir.1995) (en banc), *aff'd*, 517 U.S. 370, ----, 116 S.Ct. 1384, 1396, 134 L.Ed.2d 577 (1996) (holding that construction of patent claims, including disputed terms of art, is a question of law to be decided by the court). The second step is a question of fact. *Hilton Davis Chemical Co. v. Warner-Jenkinson Co., Inc.*, 62 F.3d 1512, 1521 (Fed.Cir.1995) (en banc), *cert. granted*, 516 U.S. 1145, 116 S.Ct. 1014, 134 L.Ed.2d 95 (1996).

a. claim construction

[12] [13] [14] [15] When construing a patent claim, a court should consider: (1) the language of the claim; (2) the specification contained in the patent; and (3) the prosecution history. *Markman*, 52 F.3d at 979. If necessary, a court may also consider extrinsic evidence, such as the testimony of an expert skilled in the art. *Id.* The starting point, of course, is to look to the language of the claim. Claims, however, "must be read in view of the specification, of which they are a part." *Id.* The next step, then, is to look to the claim specification-"a written description of the invention that must enable one of ordinary skill in the art to make and use the invention." *Id.* A patentee is his own lexicographer; therefore, the specification may act as a dictionary, defining terms which are used in the claim. *Id.* at 979-80.

[16] [17] In addition to the language of the claim and the specification, a court may also look to the patent history, the "undisputed public record of proceedings in the Patent and Trademark Office." *Id.* at 980 (internal quotation omitted). When determining the construction of a claim, a court has broad discretion to

consider, as a matter of law, statements and arguments made by the patentee to the patent office. *Id.* "Although prosecution history can and should be used to understand the language used in the claims, it too cannot 'enlarge, diminish, or vary' the limitations in the claims." *Id.* (quoting *Goodyear Dental Vulcanite Co. v. Davis*, 102 U.S. 222, 227, 26 L.Ed. 149 (1880)).

[18] [19] Finally, a court has discretion to consider extrinsic evidence, i.e., evidence external to the patent and prosecution history. *Id.* Extrinsic evidence may be considered to improve a court's understanding of the patent; however, it may not be used to vary or contradict the terms of a claim. *Id.* at 981. Extrinsic evidence may be helpful to explain scientific principles, the meaning of technical terms, the terms of art used in the patent, and the history of the patent prosecution. *Id.* at 980. It may also show "the state of the prior art at the time of the invention." *Id.* By knowing what was old, the court may better understand the new technology. *Id.* The court in *Markman* noted, however, that extrinsic evidence on how a patent should be construed is nothing more than a legal opinion, to which a court should give no deference. *Id.* at 983. A court may adopt expert legal opinions, take guidance from them, or ignore them entirely, as it sees fit. *Id.*

[20] Ultimately, in construing a patent claim, the focus is not on what the patentee subjectively intended the terms to mean. *Id.* at 986. "Rather the focus is on the objective test of what one of ordinary skill in the art at the time of the invention would have understood the term to mean." *Id.* Because of this focus, the process of patent claim construction is more like statutory construction than contract interpretation. *Id.* at 987.

b. finding of infringement

[21] [22] Once the court determines the proper construction of a patent claim, the trier of fact must determine whether the accused device infringes upon that claim. There are two types of infringement, literal and equivalent. Literal infringement occurs when each and every limitation of a claim is found in the accused product or process. *E.g.*, *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed.Cir.1991). Since every element of a claim is essential and material, *Markman*, 52 F.3d at 988, there is no literal infringement, as a matter of law, if any limitation of the claim is missing from the accused device. *London*, 946 F.2d at 1538.

[23] [24] Even if a device does not literally infringe upon a patent, it may still be unlawful, if it is equivalent to the patented device. Under the doctrine of equivalents, a court may find infringement when someone copies the heart of an invention but makes some insubstantial change in order to avoid a literal infringement. *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 607, 70 S.Ct. 854, 855-56, 94 L.Ed. 1097 (1950) (stating that such equivalent products are a "fraud on the patent"). The test to determine whether the doctrine of equivalents applies, often called the function/way/result test, is whether an alleged infringer's product or process performs substantially the same function in substantially the same way to accomplish substantially the same result as the patented invention. *Id.* at 608, 70 S.Ct. at 856. Through the doctrine of equivalents, the law protects the letter and the spirit of a patent.

[25] There are, however, two limitations on the doctrine of equivalents. The first limitation is prosecution history estoppel or "file wrapper estoppel." *E.g.*, *Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 942 (Fed.Cir.1983); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1362 (Fed.Cir.1983). Under the rule of prosecution history estoppel, something an inventor gave up during a patent's prosecution in order to obtain a patent cannot be recaptured by the doctrine of equivalents. *Hughes Aircraft Co.*, 717 F.2d at 1361. In other words, a patentee is estopped "from obtaining a claim construction that would resurrect subject matter surrendered during prosecution of his patent application." *Id.*

[26] [27] [28] [29] Prosecution history estoppel applies most often when the patentee amends his claim in order to overcome an initial rejection by the patent office. *Id.* It may also occur in a case where the patentee restricts his claim through argument to the patent office or by abandoning a claim. *Haynes Int'l, Inc. v. Jessop Steel Co.*, 8 F.3d 1573, 1579 (Fed.Cir.1993), *clarified on rehearing*, 15 F.3d 1076 (Fed.Cir.1994). When the doctrine is invoked, the court must examine what the inventor surrendered during the prosecution of his patent, either through amendment, argument, or cancellation of a claim, and the reasons for the surrender. *Hormone Research Foundation, Inc. v. Genentech, Inc.*, 904 F.2d 1558, 1564 (Fed.Cir.1990), *cert. dismissed*, 499 U.S. 955, 111 S.Ct. 1434, 113 L.Ed.2d 485 (1991). The test "for determining what subject matter was relinquished is an objective one, measured from the vantage point of what a competitor was reasonably entitled to conclude, from the prosecution history, that the applicant gave up to procure issuance of the patent." *Haynes Int'l, Inc.*, 8 F.3d at 1578. Whether prosecution history estoppel then applies is a question of law. *Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 867 (Fed.Cir.1993).

[30] Prosecution history estoppel may enable an accused infringer to obtain summary judgment by removing the fact-intensive inquiry of equivalent infringement. See *Haynes Int'l, Inc.*, 8 F.3d at 1579 (affirming district court's decision to grant the defendant's motion for summary judgment on the basis of prosecution history estoppel). On the other hand, the scope of the estoppel depends upon the facts surrounding the prosecution history. Summary judgment based upon prosecution history estoppel, therefore, is inappropriate in a case where the facts surrounding the prosecution history are in dispute. See *Hormone Research Foundation*, 904 F.2d at 1564 (finding issues of material fact regarding the prosecution history and vacating district court's summary judgment of non-infringement on the basis of prosecution history estoppel).

[31] [32] The doctrine of equivalents is also limited when the patentee's proposed construction of his claim would encompass the prior art. *Carman Industries, Inc.*, 724 F.2d at 940. An inventor may not obtain, under the doctrine of equivalents, what he could not have obtained from the patent office in literal claims due to the state of the prior art. *Wilson Sporting Goods Co. v. David Geoffrey & Assoc.*, 904 F.2d 677, 684 (Fed.Cir.1990), *cert. denied*, 498 U.S. 992, 111 S.Ct. 537, 112 L.Ed.2d 547 (1990). "[S]ince prior art limits what an inventor could have claimed, it limits the range of permissible equivalents of a claim." *Id.* To determine whether the claim of equivalency would include the prior art, the court should first construct a hypothetical patent claim, sufficient in scope to include the accused product. The court should then consider whether this hypothetical claim would have been approved by the patent office despite the prior art. If the hypothetical claim would not have been approved, it would be improper to allow the patentee to obtain coverage of the accused product under the doctrine of equivalents. *Id.*

Prosecution history estoppel and prior art are separate limitations on the doctrine of equivalents. *Haynes Int'l, Inc.*, 8 F.3d at 1579. The restrictions imposed by prosecution history estoppel, therefore, "can be, and frequently are, broader than those imposed by the prior art." *Id.* FN4

FN4. Calmac seems to confuse the two principles, arguing in its memorandum in opposition to summary judgment that the court must conduct a hypothetical case analysis to determine whether prosecution history estoppel applies in this case. Such is only the case for the prior art limitation on equivalent infringement.

2. Infringement of the '078 Patent

Dunham-Bush insists that there are no issues of material fact in dispute regarding the infringement issue

because: (1) the court must determine as a matter of law the proper construction of the '078 patent; and (2) the parties are not in disagreement about the operation of DB's ICE-CEL. Dunham-Bush further argues that it is entitled to judgment as a matter of law on these undisputed facts because they conclusively demonstrate that the ICE-CEL does not infringe upon the '078 patent. Dunham-Bush highlights several elements in claim 16 of the '078 patent which are not found in the ICE-CEL. If any one of these elements is not contained in the ICE-CEL, DB asserts it should prevail on the issue of infringement. The court finds that two of the limitations contained in claim 16 are not found in the ICE-CEL. For the reasons that follow, these two differences between claim 16 and the ICE-CEL preclude recovery in this lawsuit, and discussion of the other differences between the two inventions is unnecessary.

a. "flow of liquid in opposite directions"

[33] Paragraph D of claim 16 for the '078 patent provides the following limitation to the patent:

said grid of flexible synthetic conduits being arranged for flow of liquid in opposite directions in neighboring pairs of conduits in said grid.... FN5

FN5. A copy of the '078 patent appears in the record as Exhibit A to DB's memorandum of law.

The proper construction of this portion of claim 16 is apparent from its plain language. The statement "flow of liquid in opposite directions in neighboring pairs of conduits" obviously means that liquid in adjacent tubes must be moving in different directions. This construction is also supported by the specification of the '078 patent and its prosecution history.

The specification describes a U-bend at the ends of the supply and return conduits. Through this configuration, the liquid in neighboring tubes, one a supply tube and one a return tube, moves in opposite directions. If a person were to look at a pair of these conduits from the side, the liquid in one tube would be moving to the left while the liquid in the other tube would be moving to the right. This specification suggests a construction of the claim which requires liquid to move through neighboring tubes in different directions axially.

During the prosecution of the '078 patent, Calmac argued that claim 16 is different from Czechoslovakian patent no. 123,424 because liquid in the tubes of the Czech patent flows in the same direction. Calmac argued:

Furthermore, inviting attention to FIG. 1 of Reference L [Czech '424], it is seen that all of the tubes in any given spiral wall have the fluid therein travelling in the same direction which is entirely contrary in concept and operation from the present invention.

Amendment to the Application for the '078 Patent at 16. FN6 Also, Calmac distinguished Roma patent no. 4,054,980 on the same basis. Id. at 18.

FN6. A copy of the amendment to the '078 patent application is in the record as Exhibit E to DB's memorandum of law supporting this motion.

From the language of the claim, the specification of the patent, and the prosecution history, it is clear that the proper construction of claim 16 is that it requires liquid in adjacent tubes to flow in opposite directions. Calmac argues that, properly construed, claim 16 covers devices wherein liquid flows in the same *axial* direction in neighboring tubes but flows in opposite directions *radially*. In other words, one tube flows inside to outside in a clockwise direction while the other tube flows outside to inside in a clockwise direction. This construction of claim 16 would implicate the ICE-CEL, which has the same axial flow but opposite radial flow in its coolant tubes.

The construction of claim 16 for which Calmac argues is contrary to the plain language of the claim and the specification of the patent. Axial flow, i.e., up and down, is the common understanding of the term "flow." If Calmac had intended its invention to cover both axial and radial counterflow, it could have stated as much in claim 16. The fact that it did not differentiate between axial and radial flow supports DB's contention that the concept of "radial counterflow" was invented by Calmac for purposes of this litigation. Furthermore, the specification of *the '078 patent*, describing pairs of conduits joined by a U-bend, clearly shows that Calmac had *axial flow* in mind when it stated that liquid in adjacent tubes must flow *in opposite directions*.

[34] Having determined the proper construction of this portion of claim 16, the court must now consider whether the ICE-CEL infringes upon that claim. The parties are in agreement that liquid in neighboring tubes in the *ICE-CEL flows in the same axial direction*: if the liquid in one tube is flowing counterclockwise the liquid in its neighboring tube is also flowing counterclockwise. Therefore, no issues of material fact remain on this question, and the ICE-CEL does not literally infringe upon the "opposite direction" portion of claim 16.

[35] Calmac contends, however, that the ICE-CEL infringes upon this portion of claim 16 under the doctrine of equivalents. It argues that the ICE-BANK and the ICE-CEL serve substantially the same function, in substantially the same way, to achieve substantially the same result. There may be genuine issues of fact on the question of whether the ICE-CEL is the equivalent to claim 16; however, Calmac is precluded by prosecution history estoppel from expanding its claim in this manner.

Patent '078 was initially rejected by the patent office due to the prior art contained in the Czech patent. Paragraph D of claim 16 was added to limit the invention to devices which employ counterflow in neighboring tubes. When reasserting its claim, Calmac informed the patent office that the Czech patent used a system wherein refrigerant flowed through grid tubes in the same direction. Calmac argued to the patent office that the Czech "same flow" system was "entirely contrary in concept and operation from" the ICE-BANK system of opposite flow. Amendment to the Application for the '078 Patent at 16. Calmac raised the same argument to differentiate the '078 patent from the prior art contained in the Roma patent. *Id.* at 18. Importantly, the Roma patent used straight tubes with liquid flow in the same direction. Thus, the Roma patent had no radial flow, only axial flow. Calmac argued that its invention was different from the Roma patent because the liquid in neighboring tubes in the ICE-BANK flows in opposite directions.

A review of this uncontested prosecution history clearly reveals that Calmac surrendered the technique of same flow during the patent application process. Calmac is now estopped from resurrecting this technique in order to implicate the ICE-CEL through the doctrine of equivalents. *See, e.g., Hughes Aircraft Co., 717 F.2d at 1361.* Because the ICE-CEL does not literally infringe upon claim 16 and Calmac is precluded from employing the doctrine of equivalents to expand its claim to include the ICE-CEL system of opposite radial flow, DB is entitled to summary judgment on the issue of infringement.

b. "frozen uniformly"

Even if the ICE-CEL included the identical "opposite direction" flow as that described in the '078 patent, it would not infringe upon claim 16 because the phase change material in the ICE-CEL does not completely freeze as required by the claim.

[36] Paragraph D of claim 16 states that the opposite flow system used in the ICE-BANK provides "generally uniform transfer of heat energy between the liquid in the respective pairs of conduits and the phase change material throughout said tank." The final clause of claim 16 states:

whereby said phase change material may be alternately melted and frozen uniformly throughout the mass of said phase change material as heat is added to and withdrawn from the recirculating liquid in said system.

To accomplish this uniform freezing, the specification of the '078 patent provides for mat tubing to fill the entire volume of the tank "so that no region within the entire tank is more than a short distance away from the mat tubing." The specification further states:

Therefore, ice advantageously builds uniformly on all tubes entirely throughout the whole tank of water. The water level rises in the tank because of the increased specific volume of the ice formed but there is no sideward expansion forces as the ice joins from one spiral layer to the other because the extra water volume has been squeezed upwards previously. The rise in water level provides a measure of the extent of the fusion process. The extra water on top is the last to freeze.

Focussing on these portions of claim 16 and the specification of the '078 patent, it is clear that claim 16 only encompasses systems wherein tubing is placed throughout the entire tank and the phase change material ("PCM") is entirely frozen. The prosecution history of claim 16 likewise mandates this interpretation. When pursuing the '078 patent, Calmac argued to the patent examiner that it "is able to freeze a plastic tank of water to solid ice without rupturing the tank." Amendment to Application for the '078 Patent at 17. Calmac went on to explain that "[t]his is an astonishing result and is entirely unexpected." *Id.* Calmac emphasized that this system allows ice to build "on all of the tubes throughout the whole tank of water." *Id.* From this prosecution history, it is clear that claim 16 requires that the PCM freeze completely.

Calmac disputes this interpretation of claim 16. It argues that the patent language only states that the ICE-BANK is *able* to freeze a plastic tank of water to solid ice. This, it argues, does not mean that the patent excludes partially frozen tank systems from the invention. Calmac's proposed construction of claim 16 alters the true meaning of the claim as indicated through a review of its plain language, the specification, and the prosecution history. Claim 16 is limited to devices which freeze the PCM uniformly and completely. Any other construction of the claim distorts the undisputed patent record.

[37] The ICE-CEL does not infringe upon this limitation of claim 16. First, the ICE-CEL is designed such that portions of the tank contain no coolant tubes. Second, the ICE-CEL is designed so that certain areas of the tank, specifically the sides, the center, and the top, do not freeze. These characteristics of the ICE-CEL are not in dispute. When these characteristics are compared with claim 16, it is evident that the ICE-CEL does not literally infringe upon the '078 patent.

Calmac concedes that the ICE-CEL does not have coolant tubes throughout the tank and that the PCM in

the ICE-CEL does not normally freeze entirely. It insists, however, that the ICE-CEL nonetheless literally infringes upon the '078 patent. Although the ICE-CEL is designed to leave portions of the tank unfrozen, if the device is run improperly, all of the PCM in the tank will, in fact, freeze. For this reason, Calmac argues that the ICE-CEL literally infringes its patent. Calmac's argument on this point is frivolous. The PCM in the ICE-CEL may freeze entirely *when it is improperly operated*; however, it is undisputed that the ICE-CEL is not designed to operate in this manner. In fact, the warranty on the ICE-CEL does not apply if the consumer operates the device in such a way as to achieve 100% freezing. Misuse of a product by a consumer does not by itself transform an essential characteristic of that product. The PCM in the ICE-CEL does not freeze 100% under normal operation; it, therefore, does not literally infringe upon claim 16, which describes a device which "is able to freeze a plastic tank of water to solid ice without rupturing the tank." Amendment to the Application of the '078 Patent at 17.

[38] In the alternative, Calmac argues that the ICE-CEL infringes on the 100% freeze portion of claim 16 under the doctrine of equivalents. Calmac, however, is precluded by prosecution history estoppel from asserting this argument. Initially, the '078 patent was rejected due to the state of the prior art. To overcome this rejection, Calmac argued to the examiner that the thermal storage system described in that claim is unique because it is able to freeze an entire tank of water. Calmac described this ability as an "astonishing result" which was "entirely unexpected." Amendment to the Application of the '078 Patent at 17. Calmac convinced the patent examiner to approve claim 16 by arguing the unique ability of the ICE-BANK to achieve 100% freezing. For this reason, Calmac is now estopped from asserting that claim 16 also includes thermal storage devices wherein the PCM does not freeze entirely. *See, e.g., Hughes Aircraft Co., 717 F.2d at 1361.*

As discussed above, the ICE-CEL does not literally infringe upon the 100% freezing element of claim 16. Also, Calmac is prevented by prosecution history estoppel from asserting the doctrine of equivalents regarding this element. DB is entitled to summary judgment on the question of infringement. If there is no infringement, then no legal action can proceed against defendant Lake Taylor City Hospital Authority of Norfolk, DB's client.

III. Conclusion

Because Calmac unequivocally announced its intention not to challenge the ICE-CEL device by issuing a news release to the trade press in June, 1994, it is estopped from bringing the current infringement action. It is undisputed that DB relied on this joint announcement in pursuing development of the ICE-CEL, and that it would be prejudiced if this action were allowed to proceed. Consequently, DB's motion for summary judgment on the grounds of equitable estoppel is **GRANTED**.

Dunham-Bush is also entitled to summary judgment on its non-infringement theory. The undisputed facts in the record show no literal infringement of claim 16 because the ICE-CEL utilizes a system of circulating tubes in which the flow of liquid is always in the same direction and because the PCM in portions of the tank remains in liquid form. Neither can Calmac rely on the doctrine of equivalents. Such reliance is precluded by prosecution history estoppel as a result of Calmac's explicit claims to the patent examiner that its device uniquely utilizes the opposite flow technology to achieve total freezing of the phase change material in the tank. Accordingly, DB's motion for summary judgment on non-infringement is also **GRANTED**.

Since there is no infringement action to go forward against DB, the action is **DISMISSED** as a matter of

law as to any client of DB, namely defendant Lake Taylor City Hospital Authority. Finally, if DB intends to pursue its counterclaim against Calmac for abuse of process, it shall so notify the court within fourteen (14) days. Otherwise, that counterclaim will be **DISMISSED** by the court.

The Clerk is DIRECTED to send a copy of this Opinion and Order to all counsel of record.

It is so ORDERED.

E.D.Va.,1996.

Calmac Mfg. Corp. v. Dunham-Bush, Inc.

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