IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

HENRYK OLEKSY,	)	
Plaintiff,	)	
v.	)	No. 06 C 1245
GENERAL ELECTRIC COMPANY,	)	Judge Virginia M. Kendall
Defendant.	)	

MEMORANDUM OPINION AND ORDER

Plaintiff Henryk Oleksy filed the instant action against Defendant General Electric Company ("GE"), alleging that GE infringed his patented method for determining machining instructions to carve the root sections of turbine blades. Specifically, Oleksy asserted claims 1-4 of United States Patent No. 6,449,529 ("the '529 Patent") against GE.[1] This prolonged litigation has included considerable motion practice, discovery disputes, and claim constructions. The parties have now filed an array of motions, but currently before the Court is GE's motion for summary judgment of non-infringement. (Dkt. No. 605.) The parties agree that GE's motion hinges on two legal issues—the construction of "said movement of said spinning form cutter being in a convex path" and "trigonometric analysis of a diagram." Both limitations appear in claim 1 of the '529 Patent. GE proposes a construction that limits the method disclosed in claim 1 of the '529 Patent to one that (1) uses a computer numerical controlled ("CNC") milling machine that utilizes a form cutter that physically moves in a convex path and (2) requires the "diagram" to be a drawing of an image. If the Court were to adopt either of GE's proposed

[1] Claim 1 of the '529 Patent is the patent's only independent claim. (Dkt. No. 607, GE 56.1 ¶ 6.)

constructions, then GE asserts that its accused method would not infringe because GE's method uses a form cutter that is physically incapable of moving convex and never uses drawings; instead, GE's form cutter can only move linearly along one axis and GE does not employ a diagram that depicts surfaces and movements of its CNC machines. The Court agrees that the correct construction of "said movement of said spinning form cutter being in a convex path" means the spinning form cutter physically moves in a convex path. Claim 1 of the '529 patent therefore requires a form cutter to physically move in a convex path and GE's accused methods are incapable of such movement. The Court accordingly grants GE's motion for summary judgment of non-infringement (Dkt. No. 605), denies Oleksy's motion for summary judgment of infringement (Dkt. No. 601), and dismisses as moot the parties' remaining motions.[2]

BACKGROUND

The Court takes the following facts from the parties' respective Rule 56 statements and from the joint appendix. The facts are undisputed unless expressly noted.

The background of this case is well-known to both the Court and the parties. Oleksy worked at the Preferred Machine and Tools Products Corporation in Bedford Park, Illinois, where he developed a computer-controlled process for refining the manufacture of steam turbine blades. The United States Patent and Trademark Office ("USPTO") issued the '529 Patent covering Oleksy's method on September 10, 2002. (Dkt. No. 607, GE 56.1 ¶ 1.) The '529 Patent claims a method of determining the machining instructions for the purposes of milling root sections of turbine blades. The patented method uses a CNC milling machine to cut a concave internal hook in the root section of a turbine blade. The method requires only one machine setup and simplifies the procedure for machining the curved surface of the hook. Specifically, the '529

[2] Because the Court concludes that GE's methods does not infringe the '529 Patent, Dkt. Nos. 555, 584, 587, 589, 591, 593, 595, 598, 600, 612, 617, and 623 are dismissed as moot.

Patent's abstract describes the patented method as "[a] method of determining machining instructions during machining of a workpiece using a machine having a cutter, the surfaces of the workpiece being defined by a plurality of programmed instructions obtained by trigonometric analysis of the required curvatures of the surfaces." (Dkt. No. 306, JA 001.)

A. The '529 Patent's Claims

As stated in the Court's claim construction order, *see* Dkt. No. 382, independent claim 1 recites the elements used in conjunction to accomplish the "method of determining machining instructions . . . during machining of a workpiece": (1) at least a three-axis milling machine[3] having a spinning form cutter and a rotary table; (2) a workpiece to machine precise concave and convex surfaces within a metal block; (3) the surfaces of said workpiece defined by a plurality of programmed instructions that are obtained by trigonometric analysis; (4) that the trigonometric analysis is performed using a diagram of concave and convex surfaces and movements of the cutter and rotary table; and (5) a root section having at least a first hook as a holding hook. (*See* '529 Patent at 6:28-48; GE 56.1 ¶ 6.) Claim 1 further states that the spinning form cutter moves in a convex path while the rotary table simultaneously rotates. ('529 Patent at 6:39-41.) The CNC machine proceeds to cut the required concave hook in the root section.

Dependent claim 2 recites "[t]he method of claim 1 wherein said trigonometric analysis of the required curvatures of the surfaces comprises analysis of a diagram of a graphical construction of the required curvatures of the surfaces and the movements of said spinning cutter and said rotary table relative to the application of said spinning form cutter to the required curvatures of said root section of said turbine blade, said graphical construction consisting

[3] The Court subsequently construed "at least a three-axis computer numerical control milling machine" to mean a CNC machine with three or more axes. *See* Dkt. No. 546.

essentially of a trigonometric analysis, said root section comprising at least one holding hook." ('529 Patent at 6:49-58; GE 56.1 ¶ 10.)

Dependent claim 3 recites "[t]he method of claim 1 wherein said trigonometric analysis of the required curvatures of the surfaces and movements of said spinning cutter and said rotary table determines the path of said spinning form cutter as a curved convex radius of E plus R wherein E is the distance from center of rotary table to first holding hook and R is the radius on the first holding hook." ('529 Patent at 6:59-65; GE 56.1 ¶ 8.)

Dependent claim 4 recites "[t]he method of claim 1 wherein said trigonometric analysis of the required curvatures of the surfaces and movements of said spinning cutter and said rotary table determines the path of said spinning form cutter as a curved convex radius of E plus R wherein E+R of the convex radius is determined by points L, C, and A, L being the minimum distance P and distance M determined by angle +Q°, the angle of rotation to the left, C being the minimum distance E determined by the angle 0°; A being the minimum distance F and distance Y determined by angle -Q°, the angle of rotation to the right; E being the distance from center of rotary table to first holding hook, and R the radius on the first holding hook." ('529 Patent at 6:65-8:4; GE 56.1 ¶ 9.) The USPTO reexamined the '529 patent at GE's request and affirmed the patentability of claims 1-4.

B. Spinning Form Cutter's Physical Movement in GE's Methods

Pertinent to GE's non-infringement arguments, its accused methods utilize G01 machining commands, as opposed to G02 commands. (GE 56.1 ¶ 17.) A G01 command is referred to as a linear interpolation, resulting in short straight lines, while a G02 command is known as circular interpolation and results in a curve. (*Id.* at ¶ 18; Dkt. No. 672-2, Kim Decl. ¶ 15; Oleksy 56.1 ¶¶ 8-9.) The G-code of the embodiment disclosed in the specification is a G02

code. (Oleksy 56.1 Resp ¶ 35.) Once an operator enters a G01 command, a CNC machine continues to issue G01 orders until overridden by another command, such as G02. (GE 56.1 ¶ 19.) With respect to the machine coordinate system[4], all of GE's accused devices either only permit movement of the spinning form cutter, which is attached to the CNC machine's "spindle head," in a single linear axis or not at all. (*Id.* at ¶ 21 (Bangor facility only permits movement of the spinning form cutter along the Z axis); ¶ 22 (Bangor facility spinning form cutter can only move in a linear path along the Z axis, not along a convex path); ¶¶ 23-24 (Haas VMC machine instructs spinning form cutter to move along Z axis); ¶ 25 (spinning form cutter in LeBlond machine does not physically move at all because Y axis does not move during accused programming instructions); ¶ 27 (Mazak machine only permits spinning form cutter to move along the X axis); ¶ 29 (spinning form cutter in Okuma machine can only move along the Z axis).)

Throughout the '529 Patent's prosecution history and the litigation between the parties here, Oleksy highlighted the form cutter's convex movement. (*Id.* at ¶ 38 (Oleksy argued that United States Patent No. 4,310,878 "does not disclose spinning form cutter movement along a convex path."); ¶ 39 (during claim construction, Oleksy stated that "what's important for the invention is that [the form cutter] goes in a convex path" and that the "genius of the invention" is that "the form cutter is moving convex, and yet you end up with a concave hook"); ¶ 40 (when arguing that the '529 Patent was valid, Oleksy stated that the "claims of the Oleksy patent involve unconventional steps: moving a spinning form cutter in a convex path, while simultaneously rotating a work piece by a rotary table"). Oleksy maintains that the patented claims only require "movement of the spinning form cutter in a convex path (viewed from the

[4] In the machine coordinate system, the X, Y, and Z axes refer to the machine's physical motions. The three axes in the work coordinate system relate to the features of the work piece.

tool side) relative to the work piece," or a "convex path of the spinning form cutter (relative to the coordinate system." (*Id.* at ¶ 41.)

DISCUSSION

The parties have filed cross-motions for summary judgment regarding GE's alleged infringement of the '529 Patent, arguing different constructions for two disputed claim terms. The Court's ruling necessarily depends on the resolution of the disputed claim terms. When claim construction dictates infringement, a determination of infringement involves a two-step process. "First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process." *Yufa v. Lockheed Martin Corp.*, 575 F. App'x 881, 885-86 (Fed. Cir. 2014) (quoting *Carroll Touch, Inc. v. Electro Mech. Sys., Inc.*, 15 F.3d 1573, 1576 (Fed. Cir. 1993)). "It is only after the claims have been construed without reference to the accused [method] that the claims, as so construed, are applied" to the accused method. *See SRT Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1118 (Fed. Cir. 1985) (en banc). The Court therefore construes the disputed claim terms before beginning its infringement analysis.

I. Claim Construction

A. Legal Standard

The construction of a claim is a legal determination made by the Court that resolves disputed meanings in a patent to clarify and explain what the claim covers. *See Terlep v. Brinkmann Corp.*, 418 F.3d 1379, 1382 (Fed. Cir. 2005) (citing *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-71 (Fed. Cir. 1995)). The terms of a claim are generally given the ordinary and customary meaning that the terms would have to a person of ordinary skill in the art at the time of the filing date of the patent application and are "read in the context

of the entire patent." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005). Exceptions to this general rule arise "1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). Further, "[w]here the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside . . . the patent." *Woods v. DeAngelo Marine Exhaust, Inc.*, 692 F.3d 1272, 1283 (Fed. Cir. 2012).

When interpreting a claim, the Court initially looks to intrinsic evidence: the claim language itself, the patent specification, and the prosecution history. *See SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1195 (Fed. Cir. 2013); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("It is well settled that, in interpreting an asserted claim, the court should look first to the intrinsic evidence of record"). While the claim language is the starting point for construction because the "ordinary and customary" meaning of the claim may be readily apparent by the words themselves, *see Phillips*, 415 F.3d at 1314, courts are often required to proceed beyond the bare language of the claims and examine the patent specification. *See id.* at 1314-15. The specification itself tends to be dispositive of the dispute; "it is the single best guide to the meaning of a disputed term." *Id.* at 1315 (quoting *Vitronics*, 90 F.3d at 1582). The Court also inspects the patent's prosecution history when construing claims; while it often lacks the clarity of and is less useful than the specification, it may illustrate how the inventor understood the invention and reveal limitations to its scope. *See Phillips*, 415 F.3d at 1317. The Court may also consult extrinsic evidence including expert testimony, dictionaries, and learned treatises. *See id.* Although extrinsic evidence is less significant and helpful than intrinsic evidence, "technical treatises and dictionaries . . . are worthy of special note." *CCS Fitness, Inc.*

v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citation omitted). Courts are free to rely on dictionary definitions when construing claims "so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents." *Vitronics*, 90 F.3d at 1584 n.6.

B. Construction of the Disputed Claim Terms

Here, GE submits two phrases for construction: (1) "said movement of said spinning form cutter being in a convex path" and (2) "trigonometric analysis of a diagram." GE contends that the spinning form cutter must itself physically move in a convex path while Oleksy maintains that "convex path" is defined relative to the programmed instructions of claim 1 and that the actual machine movement is irrelevant to the claimed method. Oleksy argues that the spinning form cutter itself can move in a linear path or not at all while still forming a convex "tool path" within the work piece. GE also contends that a "trigonometric analysis of a diagram" requires analysis of a drawing, consistent with the Court's prior claim construction order. (Dkt. No. 382 at 28). Oleksy's response focuses on what it deems GE's improper addition of requiring the drawing to be on paper. For the following reasons, the Court construes "said movement of said spinning form cutter being in a convex path" to require the spinning form cutter in the patented method to physically move in a convex path from the machine's perspective because it is consistent with the plain and ordinary meaning of the phrase, the claim language, and the patent specification. The Court additionally declines to disturb its prior construction of "diagram." A "diagram" need not be on paper, but must be "a drawing designed to demonstrate or explain how something works or to clarify the relationship between the parts of a whole." (Dkt. No. 382 at 28.)

1. "Said movement of said spinning form cutter being in a convex path"

At the outset, the Court briefly addresses and disposes of two of Oleksy's arguments concerning construction of this phrase found in independent claim 1 of the '529 Patent. First and foremost, Oleksy appears to misunderstand GE's proposed construction when he argues that GE seeks to construe "convex path . . . as the path that the actual machine follows during the machining of the part." (Dkt. No. 666 at 7.) The Court has previously given "convex path" its plain and ordinary meaning because that meaning is readily apparent. *See Phillips*, 415 F.3d at 1312-13. In the current briefing, GE is not attempting to disturb the Court's prior construction of "convex path," instead, GE seeks guidance on the meaning of the phrase "said movement of said spinning form cutter being in a convex path" and whether that phrase (1) requires the cutter itself to move in a convex direction or (2) requires only an ultimate convex cut regardless of the cutter's physical movement. (Dkt. No. 606 at 11-12.) GE seeks construction of a phrase not previously construed by the Court and the Court does not consider GE's position to be a "new convex path" construction as Oleksy argues.

Second, Oleksy argues that because the "convex path" limitation appears within the context of programmed instructions, "how the physical cutter in a particular machine moves is irrelevant to satisfying this limitation." (Dkt. No. 666 at 11.) Not so. Accepting the limitation as encompassing solely a trigonometric function without reference to actual, physical movement would make the '529 Patent invalid and would expressly conflict with the Court's prior ruling on the subject. This is because "laws of nature, natural phenomena, and abstract ideas" are not patentable. *Diamond v. Diehr*, 450 U.S. 175, 185 (1981); *see also Mayo Collaborative Servs., dba Mayo Med. Labs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012) (noting that "Einstein could not patent his celebrated law that $E=mc^2$ . . . Such discoveries are manifestations

of . . . nature, free to all men and reserved exclusively to none.") (internal citations and quotations omitted). So while a mathematical formula itself is not patentable, its application may be. *See Diehr*, 450 U.S. at 187 ("an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection").

The Court deemed the '529 Patent's claimed process to be patentable "despite its reliance on mathematical equation" because "the process can only be completed if the trigonometric algorithm is combined with the following steps: (1) using a machine having a spinning form cutter and a rotary table; (2) using the trigonometric analysis to program the software instructions in the CNC milling machine; and (3) *causing the spinning form cutter to move in a convex path*, while the rotary table simultaneously rotates the work piece from a plus rotation angle to a minus rotation angle[.]" (Dkt. No. 382 at 8) (emphasis added). The Court placed particular importance on "the use of a convex tool path combined with simultaneously rotating the work piece," noting that to be the unconventional step that made the process patentable. (*Id.* at 9.) Oleksy's current attempt to devalue the physical movement of the form cutter is improper and would make the '529 Patent invalid as making the form cutter's physical movement irrelevant to the claimed process would be the equivalent of claiming the mathematical equation and adding the words "apply it." *See Mayo*, 132 S. Ct. at 1294 ("to transform an unpatentable law of nature into a patent-eligible application of such law, one must do more than simply state the law of nature while adding the words 'apply it' ") (internal citations omitted); *see also Bilski v. Kappos*, 561 U.S. 593, 610 (2010) ("the prohibition against patenting abstract ideas 'cannot be circumvented by attempting to limit the use of the formula to a particular technological environment' ") (quoting *Diehr*, 450 U.S. at 191-92).

To argue that the physical movement of the form cutter is irrelevant would disavow the integral, inventive element of the '529 Patent that made it patentable under Section 101 in the first place. Without the physical movement of the spinning form cutter that is part of the patented process, the patent claims an algorithm that would constitute non-patentable subject matter. Because accepting Oleksy's construction would render the claims invalid, the Court rejects Oleksy's argument that the physical movement of the form cutter is irrelevant to the claimed method. *See MBO Labs., Inc. v. Beckton, Dickinson & Co.*, 474 F.3d 1323, 1332 (Fed. Cir. 2007) ("claims should be construed, if possible, as to sustain their validity.") (quoting *Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999)). Moreover, Oleksy took a position inconsistent with his current argument in his response to GE's motion for summary judgment of invalidity under Section 101. In that briefing, Oleksy heralded the '529 Patent's claims of "concrete and unconventional process steps that incorporate trigonometric analysis to cause a spinning form cutter moving in a convex path, while a rotary table simultaneously rotates a work piece, to cut a concave hook." (Dkt. No. 325 at 11.) During the claim construction hearing, Oleksy argued that "what's important for the invention is that [the form cutter] goes in a convex path." (GE 56.1 ¶ 39.) The Court agreed with Oleksy's interpretation of the patent then and rejects Oleksy's current position that the movement of the form cutter is irrelevant for the additional reason that he is judicially estopped from making it. *See Butler v. Vill. of Round Lake Police Dept.*, 585 F.3d 1020, 1022-23 (7th Cir. 2009) (judicial estoppel "provides that a party who prevails on one ground in a prior proceeding cannot turn around and deny that ground in a subsequent one."); *see also Smith & Nephew Inc. v. Arthrex, Inc.*, 603 F. App'x 981, 984 (Fed. Cir. 2015) (stating general principle that the same construction should be used for validity and infringement

determinations). For these reasons, the Court rejects Oleksy's argument that the physical movement of the form cutter is of no import and proceeds to construe the disputed phrase.

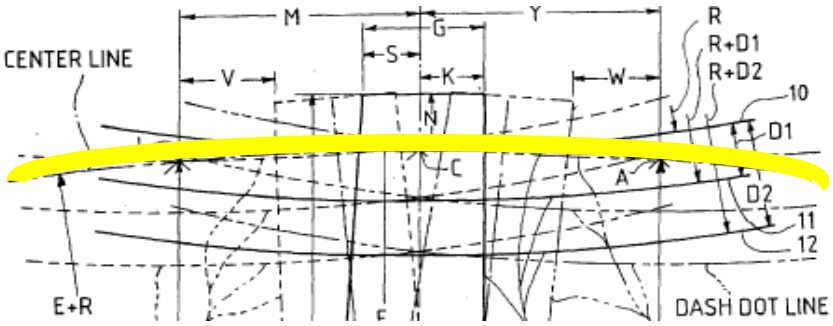
The Court concludes that the limitation in claim 1 of "said movement of said spinning form cutter being in a convex path" means the form cutter physically moves in a convex path from the machine's perspective. This construction uses the words' plain and ordinary meaning and is supported by both the claim language itself and the '529 Patent specification.

The Court looks to the claim language itself first when determining the meaning of a disputed phrase. *See Trebro Mfg., Inc. v. Firefly Equip., LLC*, 748 F.3d 1159, 1166 (Fed. Cir. 2014) ("[T]he claims themselves provide substantial guidance as to the meaning of particular claim terms.") (citation omitted). Independent claim 1 of the '529 Patent recites "[a] method of determining machining instructions for milling machinery . . . said method comprising, in combination, using a machine having a spinning form cutter and a rotary table . . . said movement of said spinning form cutter being in a convex path and said movement of said rotary table being to rotate simultaneously[.]" ('529 Patent at 6:28-41.) The claim language plainly contemplates not only the form cutter itself moving in a convex path, but also the rotary table to move simultaneously with the form cutter. Claims 3 and 4 support such a construction. *See Creative Integrated Sys., Inc. v. Nintendo of Am., Inc.*, 526 F. App'x 927, 935 (Fed. Cir. 2013) ("Other claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term."). Claims 3 and 4 both recite the method of claim 1 while noting that the trigonometric analysis "determines the path of said spinning form cutter as a curved convex radius of E plus R[.]" ('529 Patent at 6:62-63; 7:2-3.) Claims 3 and 4 therefore help solidify that the patented method contemplates the actual movement of the physical form cutter. Accepting Oleksy's position that the actual movement of

the form cutter is irrelevant would read both "movement" and "simultaneously" out of claim 1 while additionally making claim 3's determination of "the path of said spinning form cutter" unnecessary.[5] *See Enzo Biochem Inc. v. Applera Corp.*, 780 F.3d 1149, 1154 (Fed. Cir. 2015) ("Claims are interpreted with an eye toward giving effect to all terms in the claim.") (citation omitted). If Oleksy's interpretation were correct, the "movement" would be meaningless and the claim language could just as easily read that the "programmed instructions are determined by the path of the spinning form cutter."

The specification provides additional support for construing the phrase to mean actual movement on behalf of the form cutter. *See Global Traffic Techs. LLC v. Morgan*, Nos. 2014-1537, 2014-1566, 2015 WL 3513416, at *4 (Fed. Cir. June 4, 2015) ("[T]he specification is always highly relevant to the claim construction analysis.") (citation and internal quotation marks omitted). Here, when describing the patented method's key feature of precision within the work piece, the specification teaches that "the machining of the root section of the turbine blade requires convex movements of the form cutter tool (9) and the rotating of the rotary table (7) which holds the root section of the turbine blades. The form cutter (9) travels on a convex line[.]" ('529 Patent at 2:41-45.) Consistent with the claim language, the specification demonstrates that the physical movement of the form cutter is essential to the process. The specification additionally points to the "center line" of Figure 5 as the path taken by the form cutter:

[5] Oleksy argues the movement of the form cutter is irrelevant because CNC machines "can move the tool relative to the part, the part relative to the tool, or both." GE does not dispute the accuracy of this statement. The problem with Oleksy's position, however, is that the movements of the CNC machine are directly relevant to the claims in the '529 Patent. While the Court accepts that CNC machines can theoretically move in a variety of ways, claim 1 requires the movement of the spinning form cutter to occur *simultaneously* with the movement of the rotary table. ('529 Patent at 6:39-41) (emphasis added). The work piece sits on the rotary table; therefore, the patent claims moving the tool and the part at the same time.



('529 Patent Fig. 5) (emphasis added). The "center line" is equal to E+R, which both the claim language and specification refer to as a curved convex radius. ('529 Patent at 6:62-63.) Accordingly, the specification also teaches the public that the form cutter itself physically travels along a convex path.

Oleksy argues that the movement of the spinning form cutter is only part of the programmed instructions and not any actual machine movements. As support for this construction, Oleksy points to claim 1's reference to "programmed instructions" before addressing the movement of either the form cutter or the rotary table, meaning that the movement of the spinning form cutter is only relevant to the g-code that will eventually be used by the CNC machine. Accepting Oleksy's position that the movement of the spinning form cutter is merely a part of the g-code and does not correspond to any actual machine movements would directly contradict the Court's prior conclusion that Oleksy "patented a unique process of milling a root section of a turbine blade that happened to include the use of a mathematical formula as part of the process." (Dkt. No. 382 at 9.) As discussed above, removing the actual, physical movement of the form cutter from the equation would make the patented claim an abstract idea with no limit to a particular application. Because the Court has already deemed the claims found in the '529 Patent to be valid based primarily on the use of a convex spinning form cutter path, it will not construe the claims in a way to disturb that validity. *See MBO Labs.*, 474 F.3d at 1332.

The Court denies Oleksy's proposed construction for the additional reason that the spinning form cutter and rotary table are both discussed prior to mention of the "programmed instructions" in claim 1. ('529 Patent at 6:34-35.)

Oleksy's experts additionally contend that the proper vantage point for construing "movement in a convex path" is within the work coordinate system, which relates to the features of the work piece instead of the actual movement of the machine. (Kim Decl. ¶¶ 10-12, 19.) But Oleksy's attempt to require convex path to be analyzed within the work coordinate system finds no support in the intrinsic evidence. The claims never state that the convex path is measured by the relative position between the tool and the work piece. On the contrary, the specification consistently refers to the actual, physical movement of the spinning form cutter as one of the integral steps in the operation.[6] ('529 Patent at 2:44-45.) Moreover, the opinions of Oleksy's experts on this point do not alter the Court's conclusion because they conflict with the plain and ordinary meaning of "movement" by attempting to confine it unnecessarily. The plain meaning of "movement" is readily apparent; it is an act of changing physical location or position. The Court therefore resolves this dispute through the intrinsic evidence. Because the Court resolves the construction of "said movement of said spinning form cutter being in a convex path" through the intrinsic evidence of the claim language and specification consistently with the phrase's plain and ordinary meaning, the Court need not resort to extrinsic evidence. *See Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1360 (Fed. Cir. 2013); *see also Vitronics*, 90 F.3d at 1583 (in situations where analyzing the intrinsic evidence resolves any ambiguity in a disputed claim term, "it is improper to rely on extrinsic evidence") (citation

[6] Oleksy has admitted the same. During claim construction, he argued that "what's important for the invention is that [the form cutter] goes in a convex path" and the "genius of the invention" is that "the form cutter is moving convex, and yet you end up with a concave hook." (GE 56.1 ¶ 39.)

omitted). The Court construes the phrase to mean the form cutter physically moves in a convex path from the machine's perspective.

2. "Trigonometric analysis of a diagram"

GE contends that a "diagram" must be on paper and that it must show (1) the concave and convex surfaces of the root section of the turbine blade and (2) the movements of the spinning form cutter and the rotary table. The Court has already construed "diagram" and will not disturb its prior ruling with either of GE's attempts to narrow the construction.

In the parties' first round of claim construction, the Court held that the plain and ordinary meaning of "diagram" would be used here: "a drawing designed to demonstrate or explain how something works or to clarify the relationship between the parts of a whole." (Dkt. No. 382 at 28.) GE is mistaken when it argues that the "diagram" must be "on paper." (Dkt. No. 606 at 20.) Although the Court noted that during the patent's prosecution history, Oleksy emphasized that the diagram was a drawing "on paper" of a root section, the Court issued that statement when distinguishing from Oleksy's position that a "diagram" meant "a software representation." The Court did not limit a "diagram" to paper and instead pointed out Oleksy's distinction to show that a "diagram" encompassed more than "a software representation."

Nor will the Court superimpose GE's other proposed limitation on "diagram." The plain meaning of the term "diagram" is readily apparent and needs no further construction.

II. Infringement

A. Legal Standard

"[F]or a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device." *Terlep*, 418 F.3d at 1384; *see also Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997) (because each limitation

contained in a patent claim is material to defining the scope of the patented invention, a doctrine of equivalents analysis must be applied to individual claim limitations, not to the invention as a whole). Summary judgment on infringement or non-infringement is proper if "no reasonable jury could find that every limitation recited in the properly construed claim either is or is not found in the accused device." *Yufa*, 575 F. App'x at 886 (citation omitted). The patent owner has the burden to prove infringement. *See Medtronic, Inc. v. Mirowski Family Ventures, LLC*, 134 S. Ct. 843, 849 (2014).

Here, GE's methods do not infringe claim 1 of the '529 Patent either literally or via the doctrine of equivalents because the accused methods do not utilize claim 1's limitation of a spinning form cutter physically moving in a convex path.[7] Additionally, because the Court concludes that GE does not infringe the '529 Patent's only independent claim, it necessarily follows that GE does not infringe dependent claims 2 through 4. *See Yoon Ja Kim v. ConAgra Foods, Inc.*, 465 F.3d 1312, 1316 n.1 (Fed. Cir. 2006) ("Since we conclude that [the independent claim] is not infringed, it necessarily follows in this case that the dependent claims are also not infringed.").

B. Literal Infringement

Literal infringement requires that "every limitation set forth in a claim must be found in an accused product, exactly." *Teashot LLC v. Green Mountain Coffee Roasters, Inc.*, 595 F. App'x 983, 986 (Fed. Cir. 2015). Based on the Court's construction of "said movement of said spinning form cutter being in a convex path" as meaning the form cutter physically moves convex, the pertinent dispute is whether GE's methods involve a form cutter moving in a convex path. Here, the parties agree that GE's methods use G01 g-code (linear interpolation) as opposed

[7] Because the Court resolves GE's motion for summary judgment of non-infringement on this basis, it does not address GE's second argument that GE does not perform trigonometric analysis of a diagram.

to the disclosed G02 g-code (circular interpolation) found in the specification. ('529 Patent at 3:57-59.) Oleksy contends that the specification also discloses and claims G01 code, and that G01 code can create movement in a convex path just like G02 code can.[8] The Court must first determine if GE's methods literally move the spinning form cutter in a convex path. Because GE's methods only permit movement of the spinning form cutter along either one linear axis or not at all (GE 56.1 ¶¶ 21-29), when viewed within the machine coordinate system[9], they do not literally infringe claim 1of the '529 Patent because movement in a convex path, or curve, necessarily requires simultaneous movement along two axes.

The parties do not dispute that the claims require a convex path, so the analysis boils down to whether GE's methods literally involve a form cutter physically moving in a convex path. They do not. GE's accused methods use G01 g-code, which the parties agree orders the CNC machine's spinning form cutter to move in short, straight line segments. (GE 56.1 ¶¶ 17-18.) Oleksy further concedes that, with respect to the machine coordinate system, all of GE's CNC machines running the accused code do not provide for the respective spinning form cutters to move in more than a single linear axis. (*See id.* at ¶ 21 (Bangor facility only permits movement of the spinning form cutter along the Z axis); ¶ 22 (Bangor facility spinning form cutter can only move in a linear path along the Z axis, not along a convex path); ¶¶ 23-24 (Haas VMC machine instructs spinning form cutter to move along Z axis); ¶ 25 (spinning form cutter in LeBlond machine does not physically move at all because Y axis does not move during accused programming instructions); ¶ 27 (Mazak machine only permits spinning form cutter to move along the X axis); ¶ 29 (spinning form cutter in Okuma machine can only move along the Z axis).) For a spinning form cutter to literally move in a convex path, it necessarily must move

[8] The Court addresses this argument in the context of the doctrine of equivalents.
[9] The Court has already construed movement in a convex path to be within the machine coordinate system based on the plain and ordinary meaning of the terms.

along two axes simultaneously. GE's methods universally involve the spinning form cutters moving either linearly along a single axis, or in one instance, not at all. While the parties do not dispute that using G01 code to move a form cutter repeatedly can approximate a curve ultimately, each discrete physical movement of the form cutter is linear. Because the undisputed facts show that each physical movement of GE's form cutters is linear, not convex, no reasonable jury could conclude that the form cutters in the accused methods literally move in a convex path. Because the accused methods do not have this limitation, GE's methods do not literally infringe the claims of the '529 Patent. *See Teashot*, 595 F. App'x at 986.

C. Doctrine of Equivalents

Under the doctrine of equivalents, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." *Cambrian Science Corp. v. Cox Commc'ns, Inc.*, No. 2014-1686, 2015 WL 3938387, at *4 (Fed. Cir. June 29, 2015) (citation omitted). "The 'essential inquiry' in any determination under the equivalents doctrine is whether 'the accused product or process contain[s] elements identical or equivalent to each claimed element of the patented invention.' " *Siemens Med. Solutions USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269, 1279 (Fed. Cir. 2011) (alteration in original) (quoting *Warner-Jenkinson*, 520 U.S. at 40). The range of the equivalents may not be "divorced from the scope of the claims." *Vehicular Techs. Corp. v. Titan Wheel Int'l, Inc.*, 212 F.3d 1377, 1382 (Fed. Cir. 2000).

Here, the doctrine of equivalents does not save Oleksy's infringement claims. Oleksy argues at length that using G01 code infringes because it can also define a convex path. Oleksy points to the specification for support; specifically, the specification teaches that "[e]ven if

extremely short straight lines are used instead of the curved radius (E+R) as a tool path, the coordination of the end points will describe the points which still fall on the radius (E+R). Using extremely short lines instead of the curved radius (E+R) is just a different way to do the process described above. This method is an alternative method." ('529 Patent at 6:1-6.) This passage neither expands the scope of Oleksy's claims nor makes GE's method an equivalent because (1) the specification inherently recognizes that using straight lines is different than following a curved path and (2) Oleksy disclosed but failed to claim this alternative method in the patent.

The claim language requires the spinning form cutter to move in a convex path. (*Id.* at 6:39-40.) The specification defines the convex path taken by the form cutter as a "convex line," specifically, as demonstrated in the figures, as "from point A to Point L following convex path (E+R)." (*Id.* at 2:44-49.) Because E+R is the convex path contemplated in claim 1 of the patent, the specification acknowledges that using "short straight lines" is different than using the E+R, or convex, path for the form cutter. (*Id.* at 6:1-2, 5:65-67 (path of the tool along E+R "is the claimed invention").) This recognition is fatal to any doctrine of equivalents argument that Olesky could conceivably make because GE's methods, when analyzed in the proper context, use short straight line movements to approximate a convex path without the form cutters physically moving convex. Oleksy's disclosure of this "alternative method" to achieve the same or similar results as the claimed invention and subsequent failure to claim it makes the doctrine of equivalents inapplicable. *See SanDisk Corp. v. Kingston Tech. Co., Inc.*, 695 F.3d 1348, 1363 (Fed Cir. 2012) ("A patentee . . . can disclaim an equivalent by disclosing it in the specification . . . [W]hen a patent drafter discloses but declines to claim subject matter, . . . this action dedicates that unclaimed subject matter to the public.") (quoting *Johnson & Johnson Assocs. Inc. v. R.E. Serv. Co., Inc.*, 285 F.3d 1046, 1052 (Fed. Cir. 2002); *see also Pfizer, Inc. v. Teva Pharm., USA,*

Inc., 429 F.3d 1364, 1379 (Fed. Cir. 2005) ("before unclaimed subject matter is deemed to have been dedicated to the public, that unclaimed subject matter must have been identified by the patentee as an alternative to a claim limitation."). Here, Oleksy called the use of short straight lines, instead of a convex path, an alternative method. He then declined to claim this alternative. By doing so, he cannot now claim that short straight lines are within the scope of his claims. *See Unique Concepts, Inc. v. Brown*, 939 F.2d 1558, 1562-63 (Fed. Cir. 1991) (where patent claimed the use of right angle border pieces and the specification taught that "one may improvise corner pieces by miter-cutting the ends of a pair of short linear border pieces at right angles," the reference provided an alternative to corner border pieces and was not within the claim). Because Oleksy disclosed an alternative method of using short straight line segments to approximate a curve, but did not claim the alternative, the doctrine of equivalents offers him no protection.

The prosecution history supports this conclusion. When distinguishing his invention from the prior art[10], Oleksy contended that "selective interpolation is the close approximation of an arbitrary curve through the use of short line segments or arcs and does not suggest or imply a solution to machining surfaces within a metal block, that is, within and inside a metal block, wherein the surfaces are required to be precise convex and concave surfaces within a metal block." (Dkt. No. 609-6 at 2.) Oleksy further expounded upon his distinction by stating that the Heaman '369 Patent "merely teaches a numerical computer controller system for moving a part along a path, causing a curve by use of short segments of straight short segments of the line." (*Id.* at 11.) Oleksy therefore disparaged any approximation of a curve, which GE's methods do, as opposed to utilizing an actual curve in machining. This is consistent with the '529 Patent's

[10] Specifically, the Heaman '369 Patent, which sought to minimize the time needed for numerical control systems to execute commands by utilizing selective linear or circular interpolation "so that the interpolation technique which requires the least amount of data is selected." (Dkt. No. 609-6, Oleksy's Stmt. in Resp. to Req. for Ex Parte Reexamination.)

repeatedly stated goal of precision. ('529 Patent at 2:27-29 ("The root section of the turbine blade is designed to fit within precise tolerances upon a circular turbine wheel.")

CONCLUSION

For the reasons stated herein, the Court grants GE's motion for summary judgment of non-infringement (Dkt. No. 605), denies Oleksy's motion for summary judgment of infringement (Dkt. No. 601), and dismisses as moot the parties' remaining motions.

Virginia M. Kendall
United States District Court Judge
Northern District of Illinois

Date: 9/29/2015