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Step-Plus-Function Claims: An Analysis of Federal Circuit Law

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Step-Plus-Function Claims: An Analysis of Federal Circuit Law

Kyle O. Logan*

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INTRODUCTION

For several years now, there has been an ongoing debate as to whether software patents actually stifle, rather than promote, innovation in the marketplace. A leading commentator published an article in the *Atlantic* two summers ago, suggesting that patent protection in the software industry is unnecessary given the industry's natural incentives for innovation.¹ In response, another commentator wrote a follow-up article arguing that the current assault on software patents is part of a much larger effort by critics to weaken the patent system by tightening the requirements of patent-eligibility and patentability.² The same anti-patent

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¹ See Richard Posner, *Why There Are Too Many Patents in America*, ATLANTIC (July 12, 2012, 10:20 AM), <http://www.theatlantic.com/business/print/2012/07/why-there-are-too-many-patent-in-america/259725>.

² See Richard Epstein, *Richard Posner Gets It Wrong*, DEFINING IDEAS (July 31, 2012), <http://www.hoover.org/publications/defining-ideas/article/123926>.

sentiment expressed in the *Atlantic* article was echoed in a recent article appearing in the *New York Times*, criticizing software patents for being too conceptual and vague.³ By contrast, some would argue, and rightly so, that such rhetoric is based on nothing more than mere speculation and conjecture as innovation and patent protection in this country have been inextricably tied together since our nation's founding and an overwhelming majority of patents litigated thus far in the smartphone patent wars have been declared valid.⁴

The explosion of patent litigation at the district court level in recent years has paved the way towards the latest round of discussions in the debate. Since the mid-2000s, roughly 21,000 patent cases have been filed.⁵ From 2007 to 2009, the total number of patent cases filed per year fell just shy of 3,000.⁶ By 2010, that number reached 3,301.⁷ The following year, it climbed 22% to 4,015.⁸ And last year, the final tally rose 29% to 5,189, an all-time record high.⁹ During that period, cases involving software patents accounted for less than half of all filings.¹⁰ Yet, they accounted for about 89% of the increase in defendants haled into court over the same period.¹¹

Operating under the assumption that the increase in software patent litigation was largely due to the untoward behavior of certain nonpracticing entities (NPE), the White House administration decided earlier this summer to crack down on one

³ See Charles Duhigg & Steve Lohr, *The Patent, Used as a Sword*, N.Y. TIMES, Oct. 7, 2012, <http://www.nytimes.com/2012/10/08/technology/patent-wars-among-tech-giants-can-stifle-competition.html?pagewanted=all>.

⁴ See David J. Kappos, *Investing in America's Future*, 16 STAN. TECH. L. REV. 485, 486-87 (2013).

⁵ See PRICEWATERHOUSECOOPERS, 2013 PATENT LITIGATION STUDY (2013), available at http://www.pwc.com/en_US/us/forensic-services/publications/assets/2013-patent-litigation-study.pdf.

⁶ *Id.*

⁷ *Id.*

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.*

¹¹ See U.S. GOVERNMENT ACCOUNTABILITY OFFICE, INTELLECTUAL PROPERTY: ASSESSING FACTORS THAT AFFECT PATENT INFRINGEMENT LITIGATION COULD HELP IMPROVE PATENT QUALITY 14 (2013), available at <http://www.gao.gov/assets/660/657103.pdf>.

type of NPE in particular: patent monetization entities (PME).¹² PMEs, also known as patent assertion entities (PAE) or more pejoratively as patent trolls, refer to firms which acquire patents from others for the sole purpose of asserting them for profit. In so doing, the White House issued several executive orders and legislative recommendations to protect patent holders from such litigation.¹³

However, it was not until last month, according to a report published by the U.S. Government Accountability Office (GAO) as mandated by section 34 of the 2011 Leahy-Smith America Invents Act (AIA), that we learned about the actual impact of NPEs on litigation today.¹⁴ Contrary to popular opinion, the GAO report found that between 2007 and 2011 PMEs accounted for only about 20% of all filings.¹⁵ Stopping short of finding a patent litigation crisis, the GAO did nonetheless note that the patent and litigation systems could stand to benefit from greater transparency in handling cases.¹⁶ As to the patent system, the GAO recommended specifically that the PTO—the government agency responsible for issuing patents—consider boosting patent quality by sifting through internal data on the prosecution history of patents involved in litigation, identifying any undesirable patterns in examination, and modifying its examination practice accordingly.¹⁷

In sifting through the data, the avenue du jour for many litigants has been to challenge the subject matter eligibility of a patent in view of *Bilski v. Kappos*, where the U.S. Supreme Court held that the claims in the patent application at issue were drawn to abstract ideas ineligible for patent protection.¹⁸ Earlier this spring,

¹² See Edward Wyatt, *Obama Orders Regulators to Root out 'Patent Trolls,'* N.Y. TIMES, June 4, 2013, <http://www.nytimes.com/2013/06/05/business/president-moves-to-curb-patent-suits.html?pagewanted=all>.

¹³ Fact Sheet: White House Task Force on High-Tech Patent Issues, the White House, Office of the Press Secretary (June 4, 2013), <http://www.whitehouse.gov/the-press-office/2013/06/04/fact-sheet-white-house-task-force-high-tech-patent-issues>.

¹⁴ U.S. GOVERNMENT ACCOUNTABILITY OFFICE, *supra* note 11, at 15.

¹⁵ *Id.* at 17.

¹⁶ *Id.* at 36, 39.

¹⁷ *Id.* at 46.

¹⁸ *Bilski v. Kappos*, 561 U.S. 593 (2010).

the legal community received the latest installment on section 101 patent-eligibility when a deeply divided en banc panel of the U.S. Court of Appeals for the Federal Circuit handed down a 135-page decision in *CLS Bank International v. Alice Corp. Pty. Ltd.*¹⁹ The decision included one *per curiam* opinion and six separate opinions on the proper approach for determining the subject matter eligibility of software-related inventions.²⁰ Needless to say, defining this standard continues to be a struggle for courts.

However, it is worth keeping in mind one observation from a recent Federal Circuit decision on subject matter eligibility wherein the court noted that section 112 provides powerful tools that are more narrowly tailored than section 101 to weed out patent claims which are too vague or conceptual.²¹ Indeed, much of the concern over claiming software-related inventions in the abstract may be assuaged by enforcing section 112(f) when possible.

At the heart of patent law lies the notion that the claim defines the metes and bounds of an invention.²² Put another way, a patent only covers the scope of subject matter encompassed by a claim.²³ Each claim is a formal statement drawn to a specific class of invention, reciting the features of the invention.²⁴ Therefore, it is incumbent upon claim drafters to fully and particularly describe these features for purposes of providing clear notice of the claimed invention as well as a frame of reference for determining whether the invention satisfies other conditions of patentability.²⁵

That said, functional claiming is one area in which questions of definiteness commonly arise.²⁶ Functional claiming is a common drafting technique in which features are described by what they

¹⁹ *CLS Bank Int'l v. Alice Corp.*, 717 F.3d 1269 (Fed. Cir. 2013), *cert. granted*, 134 S. Ct. 734 (2013).

²⁰ *Id.*

²¹ *See Research Corp. Tech., Inc. v. Microsoft Corp.*, 627 F.3d 859, 869 (Fed. Cir. 2010).

²² *See In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1577 n.5 (Fed. Cir. 1985).

²³ *See id.*

²⁴ *See id.*

²⁵ *See Leeds v. Comm'r of Patents and Trademarks*, 955 F.2d 757, 759 (Fed. Cir. 1992).

²⁶ *See Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. § 112 and for Treatment of Related Issues in Patent Applications*, 76 Fed. Reg. 7162-01, 7164 (Feb. 9, 2011).

accomplish as opposed to what they are.²⁷ Although using functional language to limit the scope of a claim is often permissible, there is a tendency for functional limitations to blur the boundaries of a claim's scope.²⁸ That is because functional limitations cover all of the structure, material, or acts for accomplishing a function regardless of the specific means or manner for doing so disclosed in the patent's specification.²⁹ As a result of the ambiguity, a broad claim construction may raise other issues of patentability by extending the scope of a claim beyond the scope of disclosure.³⁰

Nowhere are the problems associated with functional claiming more apparent than in the computer software industry where software programs are written in terms of basic functions, commands, and instructions to be executed by a computer.³¹ In general, each program consists of one or more algorithms. Similarly, each algorithm consists of a finite sequence of steps for performing a specific task.³² Along the same lines, each step may itself require a conversion of one or more lines of source code into executable machine code.³³ Given this dynamic, software claims thus often describe what the program does, as opposed to how it does it.³⁴

Using functional limitations in software method claims is particularly troublesome, because functional limitations by definition are inherently broad and often ambiguous. For example, consider the following claim: a computer-implemented method for hedging consumption risks in energy markets including the steps

²⁷ See *Masco Corp. v. United States*, 303 F.3d 1316, 1327 (Fed. Cir. 2002).

²⁸ See *Halliburton Energy Servs., Inc. v. M-I L.L.C.*, 514 F.3d 1244, 1255 (Fed. Cir. 2008); *In re Swineheart*, 439 F.2d 210, 212–13 (C.C.P.A. 1971).

²⁹ See *Swineheart*, 439 F.2d at 213.

³⁰ See *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1353 (Fed. Cir. 2010) (en banc); *In re Hyatt*, 708 F.2d 712, 714 (Fed. Cir. 1983).

³¹ See generally Brief for the Electronic Frontier Foundation and Public Knowledge as Amicus Curiae, *CLS Bank Int'l v. Alice Corp.*, 685 F.3d 1341 (Fed. Cir. 2012) (No. 2011-1301); Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905 (2013).

³² See generally COMPUTER DICTIONARY ONLINE (2002), available at <http://www.computer-dictionary-online.org/index.asp?q=algorithm>.

³³ See Lemley, *supra* note 31.

³⁴ See *Fonar Corp. v. Gen. Elec. Co.*, 107 F.3d 1543, 1549 (Fed. Cir. 1997).

of: (1) initiating a series of transactions with consumers for a commodity at a price that corresponds to a risk position of the consumers; and (2) initiating a series of transactions with market participants for the commodity at a price that corresponds to a risk position of the market participants, wherein the risk position of the consumers balances the risk position of the market participants.³⁵ Is the scope of the claimed invention clearly indicated? Do the “initiating” steps recite a function or an act? Is there more than one way to “initiate a series of transactions?” If so, is the claim scope commensurate with the scope of disclosure?³⁶

To mitigate the potential harm typically associated with broad functional claiming, patent law imposes a special rule of claim construction upon claims reciting a limitation solely in terms of functionality.³⁷ Under 35 U.S.C. § 112(f), these purely functional limitations are sorted into two basic groups: those limitations pertaining to structure or material and those limitations pertaining to acts.³⁸ In patent parlance, the latter are commonly referred to as step-plus-function limitations whereas the former are referred to as means-plus-function limitations.³⁹ Over the years, this statutory rule has been applied in a number of cases to claims on machines, manufactures, and compositions of matter (collectively, product claims).⁴⁰ While some may argue that the rule should be applied to product claims more often than it is today,⁴¹ it is beyond question that this rule has been applied only sparingly, if ever, to process claims despite the statute being enacted into law over 60 years ago.

Since 1952, the PTO has issued millions of patents and likely millions of process patent claims. Surely, section 112(f) must apply to at least some of those claims just as it applies to some

³⁵ See U.S. Patent Application No. 08/833,892, at issue in *Bilski v. Kappos* (providing the basis for this hypothetical claim).

³⁶ See *Rengo Co. v. Molins Mach. Co.*, 657 F.2d 535, 551 (3d Cir. 1981) (explaining the relationship between the description and definiteness requirements).

³⁷ See 35 U.S.C. § 112(f) (2012).

³⁸ See *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1582–83 (Fed. Cir. 1997) (construing what is now recognized as § 112(f) as applying to two types of functional limitations).

³⁹ See *id.* at 1583.

⁴⁰ See generally *Aristocrat Techs. Austl. Pty. Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1311 (Fed. Cir. 2005) (en banc); *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580 (Fed. Cir. 1996).

⁴¹ See Lemley, *supra* note 31.

product claims. For whatever reason, the courts and litigants have largely ignored this part of the statute. Assuming that section 112(f) is in fact one of the “powerful tools” to which the Federal Circuit has alluded, it is not unreasonable to conclude that this unused tool has some role to play in controlling broad, functional claiming in process claims.

For the critics who have grown increasingly concerned over “the general problems posed by the structure and administration of our patent laws,”⁴² the following discussion is an attempt to address some of those concerns by shedding light on an area of the law with the potential to do just that but in need of further development. For example, what is a step-plus-function limitation within the meaning of section 112(f)? How does one identify such a limitation? How does one distinguish a function from an act? May one infer the intent to invoke section 112(f) from the claim language itself? Is the analysis for step-plus-function limitations different than that for means-plus function limitations? If so, why? These questions are difficult to answer, which probably explains why this part of the statute remains so undeveloped. However, in view of the current controversy over functional claiming in the software industry, these questions are particularly important and worth revisiting.

In the first section, I discuss section 112(f) and its underlying policy. In the second section, I review Federal Circuit case law on step-plus-function limitations. In the third section, I discuss some shortfalls with the current analysis for determining whether a process claim is subject to section 112(f). In the fourth section, I propose a modified approach for identifying step-plus-function limitations. In the fifth and final section, I conclude by calling for the Federal Circuit to revisit the matter in order to further equip the courts and the PTO with the tools necessary to cabin functional limitations by an improved step-plus-function analysis.

⁴² Posner, *supra* note 1.

I. 35 U.S.C. § 112(F) AND ITS UNDERLYING POLICY

In general, a claim defines the scope of invention protected by a patent. A well-defined invention during prosecution is necessary for determining whether the claimed subject matter satisfies the conditions of patentability.⁴³ Likewise, a well-defined invention during litigation is necessary for properly disposing of a claim of invalidity or infringement.⁴⁴ Accordingly, the law requires an applicant seeking patent protection to particularly point out and distinctly claim what is regarded as the invention.⁴⁵

Throughout the history of our patent system, however, the requirement of definiteness has been a moving target.⁴⁶ Prior to the Patent Act of 1952, a common law for functional claiming began to take root in courts across the country: using functional language to recite novel features of an invention renders a claim invalid for failing to particularly point out and distinctly claim the invention.⁴⁷ This restrictive view culminated at the Supreme Court in the case of *Halliburton Oil Well Cementing Co. v. Walker*.⁴⁸

There, the claims at issue were drawn to an improvement over a system for pumping oil from low-pressure oil wells, the improvement being a mechanical acoustical resonator designed to receive and amplify sound waves emanating from objects within the well.⁴⁹ In a typical claim, the improvement was defined as a “means associated with [a] pressure responsive device for tuning

⁴³ *Leeds v. Comm’r of Patents & Trademarks*, 955 F.2d 757, 759 (Fed. Cir. 1992).

⁴⁴ *See id.*

⁴⁵ *See* 35 U.S.C. § 112(b) (2012) (providing in the second paragraph of section 112 that “[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention”).

⁴⁶ *See* Homer J. Schneider, *Claims to Fame*, 71 J. PAT. & TRADEMARK OFF. SOC’Y 143, 152 (1989).

⁴⁷ *See* *Gen. Elec. Co. v. Wabash Appliance Co.*, 304 U.S. 364, 368 (1938) (invalidating the claims at issue for “fail[ing] to make a disclosure sufficiently definite” as required by 35 U.S.C. § 33, now recognized as 35 U.S.C. § 112(b)). Section 33 required the patentee to “particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery.” 35 U.S.C. § 33. Claims which recited functional language at the exact point of novelty were often invalidated for failing to adequately describe the invention. *See Gen. Elec. Co.*, 304 U.S. at 369. Although the terminology for this ground of rejection has since changed, the requirement of definiteness remains the same.

⁴⁸ *See* *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 2 (1946).

⁴⁹ *See id.* at 3, 7.

[an echo] receiving means to the frequency of echoes” emanating from those objects.⁵⁰

The Court held the claims invalid for using functional language at the exact point of novelty, and thereby failing to adequately describe the invention.⁵¹ It reasoned that an adequate description required a “full, clear, concise, and exact” description of the invention.⁵² Rather than defining the improvement in terms of its physical structure and arrangement in the combination, the

⁵⁰ Claim 1, at issue in the case, reads as follows:

In an apparatus for determining the location of an obstruction in a well having therein a string of assembled tubing sections interconnected with each other by coupling collars, means communicating with said well for creating a pressure impulse in said well echo receiving means including a pressure responsive device exposed to said well for receiving pressure impulses from the well and for measuring the lapse of time between the creation of the impulse and the arrival at said receiving means of the echo from said obstruction, and *means associated with said pressure responsive device for tuning said receiving means to the frequency of echoes from the tubing collars of said tubing sections to clearly distinguish the echoes from said couplings from each other.*

Id. at 14 n.7 (emphasis added); U.S. Pat. No. 2,156,519 col. 11, l. 64 to col. 12, l. 5 (issued May 2, 1939) (emphasis added).

⁵¹ *Halliburton*, 329 U.S. at 8. Note, however, that in the wake of *Halliburton*, the actual holding of the case was a topic for debate. See Edward S. Irons, *Halliburton Decision Clarified*, 32 J. PAT. OFF. SOC’Y 167, 167–68 (1950) (questioning whether the Court prohibited the use of functional language at any element in a combination claim or just at the point of novelty). Some believed that *Halliburton* not only embraced but also expanded upon the standard of definiteness set forth in *General Electric*. See *Leeds & Northrup Co. v. Doble Engineering Co.*, 160 F. 2d 750, 751 (1st Cir. 1947) (stating that *Halliburton* stands for the proposition that functional claiming is indefinite per se). Others believed *Halliburton* held only that a combination claim is invalid for failing to particularly point out and distinctly claim the invention if the claim uses functional language at the point of novelty. See Robert S. Smith, *Functional Claims and the Patent Act of 1952*, 48 J. PAT. OFF. SOC’Y 426, 431 (1966). This competing view was later validated in *Faulkner v. Gibbs*, 338 U.S. 267 (1949), where the Court distinguished its opinion from *Halliburton* on the ground that the invention was in the combination as opposed to any particular element in the combination. Nonetheless, even after the Patent Act of 1952, some still held fast to the view that the decision in *Halliburton* was not limited to the point of novelty. See *Moist Cold Refrigerator Co. v. Lou Johnson Co.*, 217 F. 2d 39, 42 (9th Cir. 1954) (explaining *Faulkner* as substantially narrowing the holding of *Halliburton* by permitting functional claiming in combination claims when the invention is in the combination).

⁵² *Halliburton*, 329 U.S. at 2–3.

improvement was defined in terms of functionality.⁵³ In the Court's view, the purpose of this requirement of distinctness and certainty in claim drafting was to prevent a patent's scope of protection from extending beyond the actual invention.⁵⁴

The Court then addressed the danger of allowing functional expressions in combination claims at the precise point of novelty in fields of invention crowded nearly to the point of exhaustion:

This patent . . . illustrate[s] the hazards of carving out an exception to the sweeping demand Congress made in the [pre-1952 patent statute] Petitioner was working in a field crowded almost, if not completely, to the point of exhaustion.

[. . .]

Under these circumstances, the broadness, ambiguity, and overhanging threat of [functional claiming] become apparent In this age of technological development, there may be many other devices beyond our present information—or, indeed, our imagination—which will perform [the] function [specified in] these claims. And, unless frightened from the course of experimentation by broad functional claims like these, inventive genius may evolve many more devices to accomplish the same purpose. Yet, if [these] blanket claims be valid, no device [], now known or hereafter invented, whether the device be an actual equivalent [] or not, could be used in a combination such as this, during the life of [the] patent.⁵⁵

Several years later, Congress passed the Patent Act of 1952 wherein it adopted what is now section 112(f). In so doing, purely functional limitations at the point of novelty were no longer indefinite. Section 112(f) provides that:

An element in a claim for a combination may be expressed as a means or step for performing a

⁵³ *Id.* at 9.

⁵⁴ *Id.* at 10.

⁵⁵ *Id.*

specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.⁵⁶

The legislative history is silent on the subject, so the precise rationale behind section 112(f) is unclear. The general understanding, however, is that this statutory provision was adopted in response to *Halliburton*.⁵⁷ The basic idea is that Congress amended the statute to permit purely functional claiming but addressed the Court's concern about this particular claim drafting technique by making it clear that such limitations would not give the patentee any claim scope beyond the scope of disclosure in the patent.⁵⁸

Under the statute, an element in a product claim that is described in terms of function without the recital of structure or material for performing the function is a means-plus-function limitation, and thereby subject to means-plus-function treatment.⁵⁹ As a result, every claim comprising a means-plus-function limitation is construed to cover the corresponding structure or material in the specification and equivalents thereof.⁶⁰

Similarly, an element in a process claim that is described in terms of function without the recital of acts for performing the function is a step-plus-function limitation within the meaning of section 112(f), and thereby subject to step-plus-function treatment.⁶¹ Each step-plus-function limitation is therefore construed to cover the corresponding acts in the specification and equivalents thereof.⁶² Nonetheless, in the few cases addressing the issue, establishing what is a step-plus-function limitation according

⁵⁶ 35 U.S.C. § 112(f) (2012).

⁵⁷ *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 27 (1997); *see also In re Fuetterer*, 319 F. 2d 259, n.11 (C.C.P.A. 1963).

⁵⁸ *See O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997); *see also* Virgil E. Woodcock, *Patent Act of 1952—Ten Years of Interpretation: Section 112*, 1962 A.B.A. SEC. PAT. TRADEMARK & COPYRIGHT 157, 158–59.

⁵⁹ *See Tekmar*, 115 F.3d at 1582–83.

⁶⁰ *See id.*

⁶¹ *See id.*

⁶² *See id.*

to that standard has proven to be difficult for courts due to the trouble in distinguishing between the terms “function” and “acts.”⁶³

II. CASE LAW ON STEP-PLUS-FUNCTION CLAIMS

The first case at the Federal Circuit to raise the issue was *Serrano v. Telular Corp.*⁶⁴ There, the claim was for a method of establishing communication between a conventional landline phone and a cell phone via existing telephone networks upon the occurrence of a predetermined event.⁶⁵ In particular, the method claim recited, *inter alia*, a step of automatically determining at least the last digit of a telephone number dialed on the landline.⁶⁶ The court held that the step was not written in step-plus-function form, because it recited only an act as opposed to a function.⁶⁷ Unfortunately, the court did not provide any explanation of the difference between a “function” and an “act.”

⁶³ See *infra* Part II.

⁶⁴ *Serrano v. Telular Corp.*, 111 F.3d 1578 (Fed. Cir. 1997).

⁶⁵ *Id.* at 1580.

⁶⁶ Claim 1, at issue in the case, reads as follows:

A method of interfacing a telephone communications-type device which is capable of providing a touch-tone/rotary dial-type telephone signal with a radio transceiver used in a telephone communication system wherein the transceiver is capable of radio communication with a remote radio transmitter-receiver system that is part of a telephone network, said method comprising:

coupling a transceiver to a telephone communications-type device which is capable of providing touch-tone/rotary dial-type telephone signals in order to allow for at least one-way communication between the transceiver and the telephone communications-type device;

said step of coupling comprising converting each dialed number of the telephone communications-type device into digital data;

said step of coupling further comprising automatically determining at least the last-dialed number of the telephone number dialed on the telephone communications-type device; and

sending each digitally-converted number formed by said step of converting to the transceiver for subsequent transmittal.

U.S. Pat. No. 4,775,997, col. 15, ll. 26–49 (issued Oct. 4, 1988) (emphasis added).

⁶⁷ *Serrano*, 111 F.3d at 1583.

Prior to *Serrano*, the issue was addressed on appeal in two non-Federal Circuit cases, albeit indirectly. The first case was *Ex parte Zimmerley*, decided in 1966 by the Board of Appeals at the PTO.⁶⁸ There, the applicant claimed a process for recovering molybdenum, a metal often used as an alloy with iron, from molten slags produced during copper smelting operations.⁶⁹ The process comprised a step of “raising the pH of [a] resultant pulp to about 5.0 to precipitate dissolved molybdenum as molybdenum trihydroxide.”⁷⁰ During prosecution, the claim was rejected under section 112(b) as indefinite for being unduly functional.⁷¹ According to the examiner, the claim did not “recite a specific way of raising the pH.”⁷² On appeal, however, the Board reversed the examiner’s decision.⁷³ It reasoned that section 112(f) “sanctions

⁶⁸ *Ex parte Zimmerley*, 153 U.S.P.Q. 367 (B.P.A.I. Oct. 31, 1966).

⁶⁹ *Id.* at 368.

⁷⁰ Claim 1, at issue in the case, reads as follows:

A process for recovering molybdenum values in usable form from ferruginous, molybdenum-bearing slags comprising:

subjecting such a slag to a reduction smelting operation involving heating the material and a reducing agent to a smelting temperature, the quantity of reducing agent, the temperature, and the time of said smelting operation being established to effect reduction of the molybdenum preferentially to the iron and to form a residual slag and a metallic reduction product, the latter containing most of the molybdenum present in the original slag but little of the iron;

separating said residual slag and said reduction product, and solidifying the latter;

leaching the solidified reduction product with a mineral acid under reducing conditions to extract the iron in ferrous form, whereby part of the contained molybdenum is placed and maintained in solution in a trivalent state;

raising the pH of the resulting pulp to about 5.0 to precipitate dissolved molybdenum as molybdenum trihydroxide, leaving the ferrous iron values in solution;

separating the solid and liquid phases of the resulting pulp;

leaching said solid phase with a caustic solution to extract the molybdenum content; and

separating the resulting molybdate solution from the insoluble residue.

Zimmerley, 153 U.S.P.Q. at 368; *see also* U.S. Pat. No. 3,314,783, col. 7, ll. 34-63 (issued May 6, 1963) (emphasis added).

⁷¹ *Zimmerley*, 153 U.S.P.Q. at 369.

⁷² *Id.*

⁷³ *Id.*

functionally defined steps in claims drawn to a combination of steps.”⁷⁴ As described in the specification, the step of “raising the pH” was an industry custom which referred to the practice of adding one of several alkalis to molten slags to bring about a desired pH level.⁷⁵ Therefore, the Board concluded that the disputed step was not unduly functional, and thereby not indefinite.⁷⁶

The second pre-*Serrano* case dealing with this issue was *In re Roberts*, decided in 1973 by the Court of Customs and Patent Appeals (CCPA), the predecessor to the Federal Circuit.⁷⁷ In that case, the claim was for a “method of corrugating polyethylene terephthalate film which comprises . . . *reducing the coefficient of friction of the resulting film to below about 0.40.*”⁷⁸ Rather than specifying the grounds for rejection under section 112, the examiner simply stated that reducing the coefficient of friction “define[d] a result but fail[ed] to identify the specific act or acts required to produce the result claimed.”⁷⁹ In affirming the examiner’s rejection, the Board stated that the claims were unduly functional for “fail[ing] to define the steps required to obtain the desired result.”⁸⁰

However, the Board’s decision was reversed by the CCPA on appeal.⁸¹ Turning to the statute, the CCPA noted that section 112(f) clearly sanctions functionally defined steps.⁸² Moreover, even if the Board’s rejection were characterized as one of

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ Application of Roberts, 470 F.2d 1399 (C.C.P.A. 1973) (interpreting the Board’s rejection for being “unduly functional” as a rejection for indefiniteness).

⁷⁸ Claim 5, at issue in the case, reads as follows:

The method of corrugating polyethylene terephthalate film which comprises shaping said film at a temperature in the range of about 100° to 175° C. by pressing said film between two coating rotating surfaces and *reducing the coefficient of friction of the resulting film to below about 0.40* as determined by the Bell test.

Id. at 1400 (emphasis added).

⁷⁹ *Id.* at 1402.

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² *Id.*

indefiniteness for failing to recite the acts required to execute the result-defined step, “the absence in the claim of specific [acts] which would bring about the desired [result] is no defect.”⁸³ Because the specification described how to reduce the coefficient of friction, the claim was not held indefinite for being unduly functional.⁸⁴

Although the term “step-plus-function limitation” does not appear in the *Roberts* opinion, the court’s rationale, as well as the Board’s rationale in *Zimmerley*, seems to suggest that the step fell within the purview of section 112(f).⁸⁵ That said, neither case provides much of a legal standard for identifying step-plus-function limitations.⁸⁶ However, *Zimmerley* and *Roberts* do illustrate some of the factors to be taken into consideration by later courts attempting to draw a distinction between a “function” and “acts.”

O.I. Corp. v. Tekmar Co. was the second case at the Federal Circuit to address whether a method claim limitation was written in step-plus-function form.⁸⁷ There, the claim was for a method of evaluating an analyte slug in a gas chromatograph comprising “the steps of (a) passing the analyte slug through a passage heated to a first temperature . . . and (b) passing the analyte slug through the passage that is air cooled to a second temperature.”⁸⁸

⁸³ *Id.* at 1403.

⁸⁴ *Id.*

⁸⁵ *See id.* at 1402; *see also Ex parte Zimmerley*, 153 U.S.P.Q. 367 (B.P.A.I. Oct. 31, 1966).

⁸⁶ *But see* Lawrence B. Goodwin, *Computer Patent Trial Issues: Use and Avoidance of § 112, Paragraph 6, to Make Your Case*, 78 J. PAT. & TRADEMARK OFF. SOC’Y 809, 827 (1996) (suggesting that an expression in terms of an ultimate result may establish a step-plus-function limitation).

⁸⁷ *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576 (Fed. Cir. 1997).

⁸⁸ Claim 9, at issue in the case, reads as follows:

A method *for removing water vapor* from an analyte slug passing between a sparge vessel, trap and gas chromatograph, comprising the steps of:

(a) *passing the analyte slug through a passage* heated to a first temperature higher than ambient, as the analyte slug passes from the sparge vessel to the trap; and

(b) *passing the analyte slug through the passage* that is air cooled to a second temperature below said first temperature but not

The Federal Circuit held that neither step was written in step-plus-function form.⁸⁹ In making that determination, the court first addressed when section 112(f) applies to method claims.⁹⁰ Although the statute refers to only combination claims, the court stated that a “claim for a combination” encompasses not only product claims but also process claims.⁹¹ It also stated that “steps” refer to process claim limitations, while “acts” refer to the implementation of those limitations.⁹² It, therefore, concluded that combination process or method claims are subject to step-plus-function treatment “only when steps plus function without acts are present.”⁹³

The court then reviewed the claim at issue in a manner consistent with this statutory construction.⁹⁴ Specifically, the appellee argued that the statement of purpose in the claim preamble implicated section 112(f).⁹⁵ Apparently, the argument was that the statement of purpose automatically converted each “passing” step into a step-plus-function limitation.⁹⁶ In rejecting that argument, the court explained that a limitation and function must be “individually associated” with each other in order to establish a step-plus-function limitation.⁹⁷

The court also rejected the appellee’s argument that the disputed limitations still implicated the statute because they used language nearly identical to the means-plus-function language of a related product claim.⁹⁸ In the court’s view, neither limitation in

below ambient, as the analyte slug passes from the trap to the gas chromatograph.

Id. at 1579 (emphasis added).

⁸⁹ *Id.* at 1583.

⁹⁰ *Id.* at 1582.

⁹¹ *Id.*

⁹² *Id.* at 1582–83.

⁹³ *Id.* at 1583.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.* Claim 17 reads as follows:

An apparatus for removing water vapor from an analyte slug passing between a sparge vessel, trap and analytical instrument, comprising:

the method claim recited a “function,” so the claim was not subject to section 112(f).⁹⁹ In any event, the primary question after *Serrano* and *O.I. Corp.* still remained—how does one distinguish a function from an act?

The Federal Circuit had an opportunity to answer this question two years later in *Seal-Flex, Inc. v. Athletic Track and Court Construction*.¹⁰⁰ Be that as it may, the court decided to pass on the question altogether after finding that the parties had disagreed in the prior proceedings on whether the limitation in dispute was subject to means- or step-plus-function treatment but had nonetheless stipulated to the applicability of section 112(f).¹⁰¹ Still, Judge Rader stated in a concurring opinion that a proper disposition of the case required an inquiry into whether the limitation of “spreading an adhesive tack coating for adhering [a] mat to [a] foundation over [a] foundation surface” in the method claim recited a step-plus-function limitation, a means-plus-function limitation, or neither.¹⁰²

In view of the similarities between means- and step-plus-function limitations in terms of form, terminology, and meaning, the concurring opinion set forth a framework for identifying step-plus-function limitations that closely tracks the one used to identify means-plus-function limitations.¹⁰³ The opinion stated that the recital of “steps for” in a method claim creates the presumption that a limitation was written in step-plus-function form.¹⁰⁴ It also stated that this presumption is overcome only if the limitation recites an act for achieving the function expressed by the

(a) *first means for passing the analyte slug through a passage* heated to a first temperature higher than ambient, as the analyte slug passes from the sparge vessel to the trap; and

(b) *second means for passing the analyte slug through the passage* that is air cooled to a second temperature below said first temperature but not below ambient, as the analyte slug passes from the trap to the analytical instrument.

Id. at 1579 (emphasis added).

⁹⁹ *Id.*

¹⁰⁰ *Seal-Flex, Inc. v. Athletic Track & Court Const.*, 172 F.3d 836 (Fed. Cir. 1999).

¹⁰¹ *Id.* at 847.

¹⁰² *Id.* (internal quotation marks omitted).

¹⁰³ *Id.* at 848–50.

¹⁰⁴ *Id.* at 849.

limitation.¹⁰⁵ By contrast, the absence of “steps for” in a method claim creates the presumption that a limitation was not written in step-plus-function form.¹⁰⁶ Similarly, this presumption is overcome only if the limitation recites a function without any acts for achieving that function.¹⁰⁷

Turning to the elusive question of how to distinguish a function from acts, the concurring opinion openly acknowledged that method claim limitations are generally susceptible to either interpretation.¹⁰⁸ In such situations, the claim and specification may provide some context when drawing that distinction.¹⁰⁹ Nonetheless, in the context of the statute, a “function” refers to “what [a limitation] ultimately accomplishes in relation to what the other [limitations] and the claim as a whole accomplish,” whereas “acts” refer to “how the function is accomplished.”¹¹⁰ Note, for later discussion, that elsewhere in the opinion “acts” are also referred to as steps.¹¹¹

Relying upon this framework, Judge Rader turned his attention to the claim.¹¹² Specifically, the claim recited a method for building a running track over a foundation such as asphalt or concrete, the method including a step of “spreading an adhesive tack coating for adhering [a] mat to the foundation.”¹¹³ Because

¹⁰⁵ *Id.*

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ *Id.* at 849.

¹⁰⁹ *Id.* at 850.

¹¹⁰ *Id.*

¹¹¹ *Id.* at 849.

¹¹² *Id.* at 850.

¹¹³ Claim 1, at issue in the case, reads as follows:

A method for constructing an activity mat over a foundation comprising the steps of:

spreading an adhesive tack coating for adhering the mat to the foundation over the foundation surface;

spreading a first uniform layer of particulate rubber over the tack coating;

then, in sequence, first applying a liquid latex binder to the previously spread rubber layer in sufficient quantity to coat substantially all rubber particles of said layer then air drying said applied mixture until substantially no liquid is visible, then spreading a succeeding uniform layer of particulate rubber over the preceding layers; and

the claim did not recite “steps for,” the limitation was presumed to recite an act.¹¹⁴ Given that presumption, the analysis turned to whether the limitation nevertheless recited a function to the exclusion of any acts.¹¹⁵ Without considering the overall context of the claim and specification, the analysis found that the limitation expressly stated the function: adhering the mat to the foundation.¹¹⁶ The limitation also expressly stated the act for achieving that function: spreading the adhesive tack coating.¹¹⁷ In other words, the function of adhering the mat to the foundation was accomplished by the act of spreading the adhesive tack coating.¹¹⁸ Because the limitation expressed both the function and the act, the claim should not have been construed according to the requirements of section 112(f).¹¹⁹

Judge Rader’s opinion, although only a concurrence, marked a significant development in the body of case law on step-plus-function claims, representing the first time anyone had ever attempted to construe a “function” within the meaning of section 112(f) for a method claim. Nonetheless, the question moving forward was just how receptive the rest of the bench would be to this proposed analysis.

Later that year, the patent community had an opportunity in *Micro Chemical, Inc. v. Great Plains Chemical Co.* to see whether the Federal Circuit would in fact adopt Judge Rader’s *Seal-Flex* concurrence.¹²⁰ However, the court left the answer to this question

continuing the aforesaid sequential application of latex binder, air drying the binder followed by the spreading of a uniform layer of rubber over the preceding layers until the approximate desired thickness for the mat is achieved.

Id. at 839.

¹¹⁴ *Id.* at 850.

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ *Id.* at 850–51.

¹¹⁸ *Id.*

¹¹⁹ *Id.* at 851.

¹²⁰ *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250 (Fed. Cir. 1999).

for another day after noting that the claims at issue would have been infringed no matter the claim construction.¹²¹

In *Generation II Orthotics Inc. v. Medical Technology Inc.*, the Federal Circuit vacated the district court's judgment in regards to the applicability of section 112(f), because the limitations in dispute were not written in step-plus-function form.¹²² A typical claim recited a method for bracing a knee comprising "locating a brace about the knee."¹²³ The brace was defined in the claim as having a pivotable joint between a pair of arms and an additional "joint in the brace to allow controlled medial and lateral inclination of each arm relative to [the] pivotable joint."¹²⁴

In the prior proceedings, the district court applied section 112(f) based solely on the fact that the term "to allow controlled medial and lateral inclination of each arm relative to the pivotable joint" ran parallel to the means-plus-function language of a related product claim.¹²⁵ In rejecting the lower court's rationale that

¹²¹ *Id.* at 1259 (declining to address whether disputed limitations were in step-plus-function form after concluding that the claims would have been infringed in either scenario).

¹²² *Generation II Orthotics Inc. v. Med. Tech. Inc.*, 263 F.3d 1356, 1368 (Fed. Cir. 2001).

¹²³ *Id.* at 1361.

¹²⁴ Claim 16 of U.S. Pat. No. 5,302,169 (patent '169) (issued April 12, 1994), at issue in the case, reads as follows:

A method of bracing a knee of a patient following high tibial osteotomy comprising:

locating a brace about the knee, said brace having a pair of arms to contact the leg of the patient and a pivotable joint between said arms to allow pivoting of the knee while supporting the knee, *a joint in the brace to allow controlled*

medial and lateral inclination of each arm relative to a pivotable joint; and

adjusting the inclination to provide the required bracing at the required inclination.

Id. (emphasis added).

¹²⁵ Claim 1 of patent '169, at issue in the case, reads as follows:

In an orthopaedic brace comprising: a pair of arms to be secured to a wearer's body, a pivotable joint between said arms to allow pivoting of the knee while supporting the knee, the improvement comprising:

joint means in the brace for allowing controlled medial and lateral inclination of each rigid arm relative to the pivotable joint.

Id. (emphasis added).

similar claims should be subject to similar treatment,¹²⁶ the Federal Circuit explained that such parallel reasoning has never been a sufficient reason to invoke application of the statute.¹²⁷ That is, claims are construed independently of each other.¹²⁸

In so doing, the court noted that the lack of the term “steps for” created a presumption against applying the statute.¹²⁹ It then found that the “limitation[] contain[ed] no language that would overcome the presumption.”¹³⁰ Thus, the limitation was not construed as a step-plus-function limitation.¹³¹

Generation II illustrates the initial stage of the court’s adoption of the *Seal-Flex* concurrence. The court’s rationale clearly tracks the same reasoning, embracing the principle regarding the effects of a presumption on the analysis. However, the court never stated how to rebut the presumption.

In *Epcon Gas Systems, Inc. v. Bauer Compressors, Inc.*, the Federal Circuit took a farther step towards the *Seal-Flex* concurrence by citing that opinion as a basis in part for its decision.¹³² There, the claim recited a method for introducing pressurized gas into a resin injection molding process.¹³³ The claim further recited a limitation of selectively increasing, decreasing, or maintaining the gas pressure within a mold cavity.¹³⁴

¹²⁶ *Id.* at 1368.

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ *Id.*

¹³² *Epcon Gas Sys., Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022 (Fed. Cir. 2002).

¹³³ *Id.* at 1025–26.

¹³⁴ Claim 2 of U.S. Pat. No. 5,118,455 (patent ’455) (issued June 2, 1992), at issue in the case, reads as follows:

A method of providing gas assistance to a resin injection molding process of the type in which hot resin is injected into a mold, gas is injected into the mold to displace a portion of the resin in the mold, the resin cools, the gas is vented and the mold is opened to remove the molded part, a supply of stored gas [sic, gas] is provided, the gas is injected into the mold to displace the resin in the mold cavity at a pressure that is at all times during the gas injection cycle substantially below the pressure of the stored gas supply, the improvement wherein, following the initial injection of the gas into

Because the language of the limitation essentially mirrored the means-plus-function language of an apparatus claim in the same patent,¹³⁵ the district court determined that the limitation was in step-plus-function form.¹³⁶ The Federal Circuit, however, rejected that “parallel” line of reasoning, stating that the applicability of section 112(f) is determined on a claim-by-claim basis.¹³⁷ Citing the *Seal-Flex* concurrence, it then stated that the lack of the term “steps for” anywhere in the claim created a presumption against applying the statute.¹³⁸ In the court’s view, the limitation was restricted to the recital of acts.¹³⁹ Accordingly, the court held that the limitation was not written in step-plus-function form.¹⁴⁰

In addition to moving the case law closer towards the *Seal-Flex* concurrence, *Epcon Gas* is of import because it reiterates the principle first laid down in *O.I. Corp.* that claims are evaluated independently.¹⁴¹ At that point in time, a frequent point of contention among parties was whether a process claim should be

the mold and prior to the venting of the gas from the mold, the gas pressure within the mold is selectively increased, decreased, or held substantially constant depending upon the particular requirements of the molding process.

Id. (emphasis added).

¹³⁵ Claim 16 of patent ’455, at issue in the case, reads as follows:

An apparatus for providing gas assistance to a resin injection molding process of the type in which hot resin is injected into a mold cavity, gas is injected into the mold to displace a portion of the resin in the mold, the resin cools, the gas is vented and the mold is opened to remove the molded part, the improvement wherein a supply of stored gas is provided and the apparatus includes *control means which are operative to inject gas into the mold to fill out the mold cavity at a pressure that is at all times during the gas injection cycle substantially below the pressure of the stored gas supply and which are further operative, following the initial injection of gas into the mold and prior to the venting of the gas from the mold, to selectively increase the gas pressure within the mold, decrease the gas pressure within the mold, or maintain the gas pressure within the mold at a particular value.*

Id. at 1026 (emphasis added).

¹³⁶ *Id.* at 1028.

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ *Id.*

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

subject to section 112(f) when it used language nearly identical to means-plus-function language in a related product claim.¹⁴² The idea was that similar claims should be subject to similar treatment. Nonetheless, drawing a dividing line between a function and an act was a question that remained unanswered.

That same year, in *Masco Corp. v. United States*, the Federal Circuit finally spoke definitively on the question of how to distinguish a function from an act.¹⁴³ In that case, a typical claim recited a method for controlling a combination lock.¹⁴⁴ The claim also recited that the method comprised a step of transmitting a force from a knob to a lever in order to drive the lever into a position of contact with a cam wheel.¹⁴⁵ In the proceedings below, the appellee argued the claim was subject to section 112(f) as the “transmitting” limitation was too conceptual and ambiguous to be interpreted as anything other than a function. Siding with the

¹⁴² *Id.*

¹⁴³ *Masco Corp. v. United States*, 303 F.3d 1316 (Fed. Cir. 2002).

¹⁴⁴ Claim 1 of U.S. Pat. No. 5,778,711 (issued July 14, 1998), at issue in the case, reads as follows:

A method of controlling a lock including a knob, a rotatable cam wheel operably connected to the knob and defining a surface, a locking mechanism movable between a locked position and an unlocked position, and a movable lever operably connected to the locking mechanism and having a protrusion adapted to engage the cam wheel, the method comprising the *steps of*:

holding the lever in a position where the protrusion cannot contact the surface of the cam wheel and in such a manner that the lever and the knob are operably disconnected and the lever will not move in response to rotation of the knob;

receiving an unlock signal;

forming a rigid connection between the lever and the knob with at least one substantially rigid member, while maintaining the lever in a position where the protrusion cannot contact the surface of the cam wheel, in response to a receipt of the unlock signal; and

transmitting a force applied to the knob to *the lever* through the rigid connection after the lever and the knob have been operably connected *to drive* the lever to a position where the protrusion can contact the surface of the cam wheel in such a manner that the lever will be pulled by the cam wheel during rotation of the cam wheel.

Id. at 1320 (emphasis added).

¹⁴⁵ *Id.*

appellee, the Court of Federal Claims (CFC) held that the limitation was in step-plus-function form.¹⁴⁶

The Federal Circuit, however, reversed the CFC's holding.¹⁴⁷ Guided by the rationale in the *Seal-Flex* concurrence, the court first noted the absence of "steps for" in the claim.¹⁴⁸ As a result, there was no presumption in favor of applying section 112(f) to the claim.¹⁴⁹ The court then found that the presumption had not been rebutted, because the limitation recited a function and an act.¹⁵⁰ It stated that the function of the limitation was "to drive the lever," while "transmitting a force . . . to a lever" was the act which described how to accomplish the claimed function.¹⁵¹ Therefore, the Federal Circuit held that the limitation was not written in step-plus-function form.¹⁵²

Utica Enterprises, Inc. v. Federal Broach & Machine Co. was next in the line of cases on step-plus-function claims.¹⁵³ There, the dispute involved two method claims for fastening a broach to a clamp for machining operations.¹⁵⁴ The first claim recited a method comprising a step of locking the broach into a fixed position by imposing a locking force on the broach in order to securely hold the broach in the clamp.¹⁵⁵ The second claim recited

¹⁴⁶ *Id.* at 1326–27.

¹⁴⁷ *Id.* at 1328.

¹⁴⁸ *Id.* at 1327.

¹⁴⁹ *Id.*

¹⁵⁰ *Id.* at 1327–28.

¹⁵¹ *Id.*

¹⁵² *Id.* at 1328.

¹⁵³ *Utica Enters., Inc. v. Fed. Broach & Mach. Co.*, 109 F. App'x 403 (Fed. Cir. 2004).

¹⁵⁴ *Id.* at 405.

¹⁵⁵ Claim 1 of U.S. Pat. No. 6,256,857 (patent '857) (issued July 10, 2001), at issue in the case, reads as follows:

A method of retaining a broach cutting tool member in a broach tool holder, said broach tool holder comprising:

. . . .
 said broach cutting tool member comprising . . . a peripheral outer surface . . . said peripheral outer surface having two planar abutment surfaces disposed along said peripheral outer surface and extending perpendicularly to said top end surface and said bottom end surface of said broach cutting tool member, *said two planar abutment surfaces adapted to be complementary, respectively, to said first planar and second planar abutment surfaces*, disposed on said broach cutting tool holder . . .

a method comprising a step of locking the broach and the clamp into a fixed position by imposing a locking force on the broach.¹⁵⁶

Although the Federal Circuit correctly concluded that neither claim recited a step-plus-function limitation, it is not entirely clear how the court arrived at this conclusion.¹⁵⁷ After setting forth the

said method comprising the steps of positioning said two planar abutment surfaces of said broach cutting tool member contiguous said first planar and said second planar abutment surfaces, respectively, of said broach tool holder and simultaneously locating said bottom end surface of said broach cutting tool member on said intermediate surface of said broach tool holder whereby when said broach cutting tool member is positioned in said broach tool holder a predetermined accurate work position is established for said broach cutting tool member; and

locking said broach cutting tool member in said predetermined accurate work position, by imposing a locking force on said at least a portion of said third planar abutment surface of said broach cutting tool member, said locking force having a force component directed towards said two planar abutment surfaces of said broach cutting tool member and a force component directed downward from said top surface towards said intermediate surface of said broach tool holder to securely hold said broach cutting tool member in said broach tool holder.

Id. at 405–06 (emphasis added).

¹⁵⁶ Claim 3 of patent '857, at issue in the case, reads as follows:

A method of retaining a broach cutting tool member in a broach tool holder . . . said method comprising the steps of:

. . .
positioning said first and second planar surfaces on said one of said broach cutting tool member and said broach tool holder contiguous to said respective complementary first and second planar surfaces on said other of said broach cutting tool member and said broach tool holder whereby when said one of said broach cutting tool member and said broach tool holder is positioned contiguous to said other of said broach cutting tool member and said broach tool holder a *predetermined accurate work position* is established; and

locking said one of said broach cutting tool member and said broach tool holder in said predetermined accurate work position by imposing a locking force on said at least a portion of said third planar surface whereby said locking force generates a force component in a direction downward from said first top surface towards said second lower surface and a force component towards said first and second planar surfaces of one of said broach cutting tool member and said broach tool holder.

Id. at 406 (emphasis in original).

¹⁵⁷ *Id.* at 410.

rule on presumptions regarding section 112(f), the court stated that a method claim limitation is in step-plus-function format only if it recites a step plus a function without the recital of acts in support of that function.¹⁵⁸ Reviewing the claims, it first noted that because neither claim used the term “step for,” the presumption was that the limitations were not in proper form.¹⁵⁹ In regards to the first claim, the court found that the limitation’s function was to securely hold the broach in the clamp.¹⁶⁰ It also found that “imposing a locking force on the broach” was the act for accomplishing the function, because it described how to “securely hold the broach in the clamp.”¹⁶¹ The court thus held the limitation was not in step-plus-function form as it recited a function and an act in support thereof.¹⁶²

On closer scrutiny, however, it would seem that “imposing a locking force on the broach” better describes how to “lock[] the broach into a fixed position” which, in turn, describes how to “securely hold the broach in the clamp.”¹⁶³ Put another way, “securely hold[ing] the broach in the clamp” is the function of “locking the broach into a fixed position” which, in turn, is the function of “imposing a locking force on the broach.”¹⁶⁴ Accordingly, “imposing a locking force on the broach” is the act describing how to “lock[] the broach into a fixed position,” while “locking the broach into a fixed position” is the act describing how to “securely hold the broach in the clamp.”¹⁶⁵ Therefore, contrary to the court’s analysis, the claim limitation recites a plurality of functions and acts.¹⁶⁶

Turning to the second claim, the court held that the limitation of “locking the broach into a fixed position by imposing a locking force on the broach” was not subject to section 112(f).¹⁶⁷ In its

¹⁵⁸ *Id.* at 409.

¹⁵⁹ *Id.*

¹⁶⁰ *Id.* at 409–10.

¹⁶¹ *Id.* at 410.

¹⁶² *Id.*

¹⁶³ *Id.* at 405–06.

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*

¹⁶⁶ *Id.*

¹⁶⁷ *Id.* at 406.

view, the limitation “did not expressly specify the function that the ‘locking’ step [was] to perform.” The court nevertheless found that the phrase “imposing a locking force on the broach” constituted the act for accomplishing the unspecified function.¹⁶⁸ Query how the court was able to determine the act without first determining the limitation’s function.

Upon further consideration, however, there is another way to reasonably interpret the limitation. According to that interpretation, the function is to “lock[] the broach and the clamp into a fixed position” while “imposing a locking force on the broach” is the act describing how to accomplish the function.¹⁶⁹ Nonetheless, neither limitation is in step-plus-function form, because each recites a function with an act. The point here is that this case provides yet again another example in the case law of the difficulty in distinguishing between a function and an act.

Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc. is the most recent decision on step-plus-function case law at the Federal Circuit.¹⁷⁰ In that case, the claim recited a heart stimulation method comprising a step of “determining a condition of the heart from among a plurality of conditions of the heart.”¹⁷¹ The court summarily decided the issue, holding that the step was not a step-

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 381 F.3d 1371 (Fed. Cir. 2004).

¹⁷¹ Claim 1 of U.S. Patent No. 4,407,288 (filed Mar. 16, 1983) (issued Oct. 4, 1983), at issue in the case, reads as follows:

A method of heart stimulation using an implantable heart stimulator capable of detecting a plurality of arrhythmias and capable of being programmed to undergo a single or multi-mode operation to treat a detected arrhythmia, corresponding to said mode of operation the method comprising the steps of:

(a) *determining a condition of the heart from among a plurality of conditions of the heart;*

(b) selecting at least one mode of operation of the implantable heart stimulator which operation includes a unique sequence of events corresponding to said determined condition; and

(c) executing said at least one mode of operation of said implantable heart stimulator thereby to treat said determined heart condition.

Id. at 1375 (emphasis added).

plus-function limitation.¹⁷² Citing *O.I. Corp.*, it simply noted that section 112(f) is implicated only if a function without acts is present.¹⁷³ It then found, without further explanation, that the limitation in dispute recited only an act.

III. SHORTFALLS WITH THE CURRENT APPROACH

Assuming the Federal Circuit's sole approach to determine whether a process claim limitation is written in step-plus-function form is the one set forth in the *Seal-Flex* concurrence, such an approach is still problematic. First, there is a tendency under the analysis to read process claim limitations in a way that effectively sanctions pre-*Halliburton* style functional claiming. Second, there is a tendency under the analysis to read process claim limitations in a way that contradicts longstanding policy concerns behind section 112(f).

According to the current analysis, a limitation in a process claim may assume three basic forms. In the first case, the limitation recites only a function.¹⁷⁴ In the second case, the limitation recites only an act.¹⁷⁵ In the third case, the limitation recites both a function and an act.¹⁷⁶ Although the analysis in the *Seal-Flex* concurrence works for limitations that clearly recite a function and an act for achieving that function,¹⁷⁷ the analysis leaves much to be desired when identifying whether a limitation should be deemed either one or the other.¹⁷⁸ According to Judge Rader, "method claim elements often recite phrases susceptible to interpretation as either a function or as an act for performing a

¹⁷² *Id.* at 1381.

¹⁷³ *See id.*

¹⁷⁴ *See Seal-Flex, Inc. v. Athletic Track & Court Const.*, 172 F.3d 836, 849–50 (Fed. Cir. 1999)

¹⁷⁵ *See id.*

¹⁷⁶ *See id.*

¹⁷⁷ *See id.* at 850 (finding the *function* and *act* expressly stated in the limitation); *see also Masco Corp. v. United States*, 303 F.3d 1316, 1327 (Fed. Cir. 2002) (noting that the limitation recited the *function* and *act*).

¹⁷⁸ *Compare Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 381 F.3d 1371, 1381 (Fed. Cir. 2004), *with Serrano v. Telular Corp.*, 111 F.3d 1578, 1583 (Fed. Cir. 1997) (construing limitations of simple expressions as acts without turning to other sources of intrinsic evidence that call into question those claim constructions).

function.”¹⁷⁹ Given the ambiguity, it is not uncommon to interpret a limitation as an act when in fact the limitation is a function.

For example, suppose a claim recites a computer-implemented method for managing and tracking life insurance policies.¹⁸⁰ The method comprises several limitations, one of which recites “generating a life insurance policy including a stable value protected investment with an initial value based on a value of underlying securities.”¹⁸¹

A quick assessment of the claim shows that the limitation contains language that may be deemed either a function or an act, but not both. The term “including a stable value protected investment with an initial value based on a value of underlying securities” is not a separate act, because it is just describing the structure of the policy instead of how the policy is generated¹⁸². Thus, the determinative term in the limitation is “generating a life insurance policy.”¹⁸³ Absent the recital of “step for,” the presumption is that the limitation recites only an act.

¹⁷⁹ *Seal-Flex*, 172 F.3d at 849.

¹⁸⁰ Claim 9 of U.S. Patent No. 5,926,792 (Patent ’792) (filed Sept. 18, 1998) (issued July 20, 1999), at issue in *Bancorp Servs., LLC v. Sun Life Assurance Co. of Can.*, 687 F.3d 1266 (Fed. Cir. 2012), reads as follows:

A method for managing a life insurance policy on behalf of a policy holder, the method comprising the steps of:

generating a life insurance policy including a stable value protected investment with an initial value based on a value of underlying securities;

calculating fee units for members of a management group which manage the life insurance policy;

calculating surrender value protected investment credits for the life insurance policy;

determining an investment value and a value of the underlying securities for the current day;

calculating a policy value and a policy unit value for the current day;

storing the policy unit value for the current day; and

one of the steps of:

removing the fee units for members of the management group which manage the life insurance policy, and

accumulating fee units on behalf of the management group.

¹⁸¹ U.S. Patent No. 5,926,792 (filed Sept. 18, 1998) (issued July 20, 1999).

¹⁸² *Id.*

¹⁸³ *Id.*

If in fact the limitation recites only an act for achieving a function, then the question becomes: what is that function? Recall under the *Seal-Flex* concurrence the underlying function of a limitation corresponds to what the limitation ultimately accomplishes relative to what the other limitations and the claim as a whole accomplish, whereas the act corresponds to how the function is accomplished.¹⁸⁴ It stands to reason that determining the act or acts of a limitation presupposes determining the function of the limitation.

That said, it is impossible to say whether the Federal Circuit would deem this term a “function,” because the case law has yet to explain how to show “what a limitation ultimately accomplishes” as required for such a determination.¹⁸⁵ However, given that software inventions are often claimed in terms of functionality, is it safe to presume that “generating a life insurance policy” is a functional limitation?

Consulting the specification would inform the analysis by adding context to a determination of the underlying function of the limitation.¹⁸⁶ Without looking to the specification for the meaning and scope of functional language, there is no way to reasonably make such a determination. As a result, the limitation in this example is just as likely to be interpreted incorrectly as it is to be interpreted correctly.

One could reasonably infer, in view of this hypothetical, that there are a large number of “de facto step-plus-function claims” in the patent system today that have evaded the claim construction requirements of section 112(f) by masquerading as standard process claims. Consequently, functional claiming today shares features with the practice that was rebuked in *Halliburton*.¹⁸⁷

¹⁸⁴ *Seal-Flex*, 172 F.3d at 849–50.

¹⁸⁵ *See id.* at 849 (stating that a function in the context of the statute corresponds to what the element ultimately accomplishes relative to the accomplishments of the other elements and claim as a whole).

¹⁸⁶ For a discussion on the function of “generating a life insurance policy” as contemplated by the inventor, see Patent ’792 col. 11, l. 60 to col. 12, l. 63.

¹⁸⁷ Compare Lemley, *supra* note 31, with Smith, *supra* note 51, at 433–34 (quoting P.J. Federico, a key member of the Bryson subcommittee of the House Judiciary Committee responsible for preparing the first draft of the Patent Act of 1952, who questioned

After a careful review of the case law, it is not surprising to see how the Federal Circuit has never found a step-plus-function limitation. Unlike the clear, concrete difference between means and structure/material in means-plus-function limitations, the difference between a function and an act in step-plus-function limitations can be an “eye of the beholder” type of inquiry. Complicating the matter even further is the fact that both terms are defined in terms which are interchangeable with each other. For instance, an “act” is defined as the process of doing: action.¹⁸⁸ A “function,” on the other hand, is defined as an action for which a person or thing “is specially fitted or used or for which a thing exists: purpose.”¹⁸⁹

In view of these two definitions, distinguishing a function from an act is, on the surface, a distinction without a difference; however, a closer inspection reveals a critical but subtle difference between the two concepts. The difference is that all functions are acts but not all acts are functions. Rather than asking whether a limitation recites a function or an act, one must ask whether the act recited in the limitation rises to the level of a function, i.e., is the act the purpose of another act? The best way to illustrate this idea is by example.

Recall the patent in *Utica*, which was directed to a process for shaping the surface of metals using a broach.¹⁹⁰ There were two claims at issue, one of which recited a method for setting a broach in a clamp comprising, *inter alia*, the step of locking the broach into a fixed position by imposing a locking force on the broach in order to securely hold the broach in the clamp.¹⁹¹ By definition, one can clearly see that the limitation includes three acts: (1) locking the broach into a fixed position, (2) imposing a locking force on the broach, and (3) securely holding the broach in the

whether the enactment of paragraph 3 of section 112 (now section 112(f)) rendered cases such as *Halliburton* obsolete or simply modified).

¹⁸⁸ *Act Definition*, MERRIAM-WEBSTER ONLINE DICTIONARY, <http://www.merriam-webster.com/dictionary/act> (last visited May 28, 2014).

¹⁸⁹ *Function Definition*, MERRIAM-WEBSTER ONLINE DICTIONARY, <http://www.merriam-webster.com/dictionary/function> (last visited May 28, 2014).

¹⁹⁰ *Utica Enters., Inc. v. Fed. Broach & Mach. Co.*, 109 F. App’x 403, 405 (Fed. Cir. 2004).

¹⁹¹ *Id.* at 405–06.

clamp.¹⁹² More specifically, “locking the broach into a fixed position” is a function, because it is the purpose of “imposing a locking force on the broach.”¹⁹³ Likewise, “securely holding the broach in the clamp” is a function, because it is the purpose of “locking the broach into a fixed position.”¹⁹⁴ The limitation, therefore, includes three acts, but only two of them are functions.

The example also illustrates another idea. This is that the relationship between a function and an act is analogous to the relationship between a genus and species. In general, a genus refers to a class within a hierarchy of living things having one or more attributes in common, whereas a species refers to a subclass within a genus having more attributes in common. In other words, a genus comprises all of the species within that class. Likewise, a function within the meaning of section 112(f) comprises all of the acts for performing that function. Note, in the example, how the function of “locking [the] broach [into a fixed] position” is to “securely hold [the] broach [in the clamp.]”¹⁹⁵ However, as noted above, “locking [the] broach [into a fixed position]” and “securely hold[ing the] broach [in the clamp]” are by definition both acts.¹⁹⁶ “Securely hold[ing the] broach [in the clamp]” just happens to be a certain type of act.¹⁹⁷

The point here is that a process claim limitation always recites an act in the generic sense of the word,¹⁹⁸ because a function is merely an abstraction referring to a category of acts intended to accomplish a specified function. Thus, in the example, “securely hold[ing the] broach [in the clamp]” refers to a category of acts which includes “locking [the] broach [into a fixed] position.”¹⁹⁹ Similarly, “locking [the] broach [into a fixed] position” refers to a category of acts which includes “imposing a locking force [on the

¹⁹² See *id.* at 407–11 for the court’s actual findings of fact and conclusions.

¹⁹³ *Id.* at 405 (quoting U.S. Patent No. 6,256,857 (filed Jan. 21, 1997)).

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

¹⁹⁶ *Id.*

¹⁹⁷ *Id.*

¹⁹⁸ *Cf.* Smith, *supra* note 51, at 433 (implying that a “function” within the meaning of the third paragraph (now sixth paragraph) of section 112 is synonymous with “act”).

¹⁹⁹ *Utica*, 109 F. App’x at 405–06 (quoting U.S. Patent No. 6,256,857 (filed Jan. 21, 1997)).

broach].”²⁰⁰ Until the Federal Circuit explores these concepts in greater detail, lower courts will continue to struggle with identifying step-plus-function limitations in process claims.

In addition to the difficulty in distinguishing a function from an act, the current analysis is susceptible to claim constructions that contradict longstanding policy concerns with respect to functional claiming. Given that the purpose of section 112(f) was to allow purely functional claiming limited only by the specific implementations of that function described in the specification or their equivalents, it seems highly unlikely that Congress intended for patent holders to circumvent the claim construction requirements of the statute by claiming purely functional limitations in process claims rather than product claims. Yet, that appears to be what is happening.

As early as *O.I. Corp.*, the Federal Circuit stated unequivocally that each claim must be independently reviewed when determining the applicability of section 112(f).²⁰¹ The court rejected the appellant’s “parallelism” argument, explaining that the recitation of a process claim limitation in language nearly identical to that recited in a means-plus-function limitation of a related product claim is not necessarily subject to step-plus-function treatment.²⁰² The court ultimately held that the limitation was not written in step-plus-function form.²⁰³ This issue arose again in *Epcon Gas*, where the court reiterated the same position: a process claim is not subject to section 112(f) simply because it recites a limitation in terms parallel to the terms used to describe the means-plus-function limitation of a product claim.²⁰⁴ In sum, the very same language that is deemed “functional” for purposes of section 112(f) with respect to product claims is not regarded as “functional” with respect to process claims.

²⁰⁰ *Id.*

²⁰¹ *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997).

²⁰² *Id.* at 1583–84.

²⁰³ *Id.* at 1583.

²⁰⁴ *Epcon Gas Sys., Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022, 1029 (Fed. Cir. 2002).

In view of the policy concerns with respect to functional claiming that were addressed by the Court in *Halliburton*,²⁰⁵ it is unclear how a process claim limitation is any less threatening than a product claim limitation having nearly identical claim language. Consider, for example, a claimed invention which is directed to a software product and process for managing and tracking a life insurance policy.²⁰⁶ The product claim comprises several limitations, one of which includes an “investment determining means for determining an investment value.”²⁰⁷ Likewise, the process claim comprises several limitations, one of which includes “determining an investment value.”²⁰⁸

²⁰⁵ *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 12 (1946).

²⁰⁶ See U.S. Patent No. 5,926,792 (filed Sept. 9, 1996).

²⁰⁷ Claim 1 of the '792 patent, at issue in *Bancorp Services LLC v. Sun Life Assurance Co. of Can.*, 687 F.3d 1266 (Fed. Cir. 2012), reads as follows:

A computer system for managing a life insurance policy on behalf of a policy holder, the computer system comprising:

generating means for generating a life insurance policy including a stable value protected investment with an initial value based on a value of underlying securities;

fee calculating means for calculating fee units for members of a management group which manage the life insurance policy;

credit calculating means for calculating surrender value protected investment credits for the life insurance policy;

investment determining means for determining an investment value and a value of the underlying securities for the current day;

policy calculating means for calculating a policy value and a policy unit value for the current day;

storing means for storing the policy unit value for the current day; and

one of:

removing means for removing the fees units for members of the management group which manages the life insurance policy, and

accumulating means for accumulating fee units on behalf of the management group.

U.S. Patent No. 5,926,792 col. 15 ll. 47–48.

²⁰⁸ In *Bancorp Services LLC*, Claim 9 of the '792 patent was at issue and reads as follows:

A method for managing a life insurance policy on behalf of a policy holder, the method comprising the steps of:

generating a life insurance policy including a stable value protected investment with an initial value based on a value of underlying securities;

The product claim limitation recites a function of “determining an investment value” without reciting any structure for achieving that function; the limitation is therefore in means-plus-function form.²⁰⁹ On the other hand, a similar determination as to the process claim limitation is not as clear. “[D]etermining an investment value” could refer to an act just as easily as it could refer to a function.²¹⁰ Unfortunately, there is no way to reasonably determine whether the limitation should be deemed a function or an act without turning to the specification for the intended meaning and scope. Nevertheless, absent the recital of “steps for” triggering a presumption in favor of applying section 112(f), and given that under the current approach that absence triggers the opposite presumption, the limitation would not likely be construed as a step-plus-function limitation.

Inconsistent outcomes such as these undoubtedly call into question the legitimacy and reasonableness of a statutory scheme which tolerates, through clever draftsmanship, different treatment of product and process claims employing essentially the same claim language.²¹¹ Consider, as a case in point, the implications of these outcomes. On the one hand, construing claim language as a means-plus-function limitation is tantamount to saying that the language is purely functional. On the other hand, not construing

calculating fee units for members of a management group which manage the life insurance policy;
 calculating surrender value protected investment credits for the life insurance policy;
determining an investment value and a value of the underlying securities for the current day;
 calculating a policy value and a policy unit value for the current day;
 storing the policy unit value for the current day; and
 one of the steps of:
 removing the fee units for members of the management group which manage the life insurance policy, and
 accumulating fee units on behalf of the management group.

Id. col. 16 ll. 66–68 (emphasis added).

²⁰⁹ *Id.* col. 15 ll. 47–48.

²¹⁰ *Id.* col. 16 ll. 66–68.

²¹¹ *Cf.* Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1294 (2012) (internal citations omitted) (stating that statutes should not be interpreted “in ways that make patent eligibility ‘depend simply on the draftsman’s art’ without reference to the principles underlying the prohibition against patents for [natural laws]”).

essentially the same claim language as a step-plus-function limitation is equivalent to saying that the language is “not” purely functional. In effect, the law is simultaneously treating essentially the same claim language as a purely functional limitation and a non-purely functional limitation. In view of inconsistencies such as this, it seems untenable to maintain the current approach.

IV. MODIFIED APPROACH

Determining whether a process claim limitation is subject to section 112(f) should ideally be a straightforward yet structured analysis. The analysis should be able to make the determination quickly, allowing courts time to focus on other pressing issues. Similarly, it should permit one and only one determination, and that determination should be consistent with the overall context of the claim, specification, and prosecution history of the patent. Furthermore, it should promote the underlying policy of the statute while applying the law so as to avoid exalting form over substance. The Federal Circuit’s current approach falls short of these objectives.

To address these shortfalls, the Federal Circuit should adopt the following framework consisting of three simple steps. First, the court determines the function of the claim limitation. The “function” refers to what the limitation ultimately accomplishes relative to the overall context of the claim. Importantly, the function must be understood in the context of the specification and prosecution history. Second, the court determines whether the determined function is expressly stated in the limitation. Answering this question in the negative concludes the analysis. In other words, the limitation is not in step-plus-function form if the function is not expressly stated therein. If, however, the limitation expressly states the determined function, then the analysis proceeds to the next step. Third and finally, the court determines whether the limitation recites any acts for performing the determined function. “Acts” refer to how the determined function is accomplished. That is, the “function” is the “what,” and the “act” is the “how.” If the court determines that the limitation recites a function to the exclusion of any acts, then the limitation is

deemed to be written in step-plus-function form and thereby subject to the claim construction requirements of section 112(f). That said, if the limitation is still ambiguous at that point, the court should err on the side of caution by deeming the limitation a function and construing the claim in accordance with section 112(f).

To illustrate how the proposed analysis works in practice, consider the claim at issue in *Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.*²¹² discussed earlier. There, the claim was for a method for stimulating a heart using a pacemaker.²¹³ The method comprised several limitations, one of which included “determining a condition of the heart from among a plurality of conditions of the heart.”²¹⁴ After finding a presumption against applying section 112(f) in the absence of the term “steps for,” the Federal Circuit held that this specific limitation was not written in step-plus-function form.²¹⁵

By contrast, the same limitation would have fared very differently under the proposed analysis. As stated, the first step in the analysis is to determine the function of the limitation. A quick examination reveals that the “determining” limitation recites either a function or an act, but not both. Whether the recitation rises to the level of a function cannot be determined without more context. That is, whether “determining a condition of the heart” constitutes a “function” is indeterminable absent further evidence.

Given the ambiguity, the analysis must broaden the scope of its examination so as to ascertain what the limitation ultimately accomplishes in the overall context of the claim. According to the preamble, the overall objective of the method is to stimulate a heart through the use of a pacemaker.²¹⁶ To that end, the claim recites a method comprising three limitations.²¹⁷ Ignoring the limitation in dispute for the moment, the goals of the two other limitations are respectively to “select[] at least one mode of operation of the

²¹² 381 F.3d 1371 (Fed. Cir. 2004).

²¹³ *Id.* at 1375.

²¹⁴ *Id.*

²¹⁵ *Id.* at 1381–82.

²¹⁶ *Id.* at 1375.

²¹⁷ *Id.*

implantable heart stimulator . . . corresponding to said determined condition” and to “treat said determined heart condition.”²¹⁸ Therefore, to accomplish the overall objective, the method must at least be capable of selecting the corresponding mode of operation and treating the determined heart condition. Likewise, accomplishing the goals of the two other limitations presupposes that the method is capable of determining one of several heart conditions. Thus, although the disputed limitation may accomplish any number of things, it must ultimately determine a particular condition of the heart. Accordingly, the function of the disputed limitation is to determine a heart condition from a plurality of conditions of the heart.

Moreover, this determination is consistent with the specification. In fact, the specification uses “step” and “function” interchangeably when referring to limitations of the claimed method.²¹⁹ More specifically, the specification discloses a process for determining the occurrence of a particular cardiac state using dedicated cardiac state evaluation circuitry.²²⁰ Additionally, the specification further discloses that determining the occurrence of a particular cardiac state may also be accomplished by using conventional logic circuitry.²²¹ In other words, “using dedicated cardiac state evaluation circuitry” and “using conventional logic circuitry” are both acts describing how to determine heart conditions. Surely, the function is to determine a condition of the heart in view of the specification’s disclosure and claim as a whole.

Because the limitation recites the underlying function without the recital of any acts for accomplishing the function as required by the second and third steps of the proposed analysis, one must conclude that the limitation is written in step-plus-function form and thereby subject to the requirements of section 112(f).

Although this proposal is not a dramatic departure from the current approach set forth in the *Seal-Flex* concurrence, the situation does not call for a dramatic response. Rather, the

²¹⁸ *Id.*

²¹⁹ U.S. Pat. No. 4,407,288 col. 7 ll. 7–14 (filed Mar. 16, 1981).

²²⁰ *Id.* at col. 9, l. 9 to col. 10, l. 18.

²²¹ *Id.* at col. 10, ll. 19–28.

situation dictates a measured response. Judge Rader's framework for analysis provides a solid foundation upon which new case law can build. The objective of this proposal is to strengthen the current approach by addressing the shortfalls related thereto.²²² To that end, the proposed analysis is (1) more straightforward than the current approach, (2) more structured than that approach, and (3) more likely than that approach to promote the policy concerns behind section 112(f). The reasons are described below.

First, rather than inquiring into the mind of a drafter to discern whether he or she intended to invoke application of section 112(f) based on the presence or absence of the term "steps for," the proposed analysis cuts straight to the chase—what is the function? Although the presumptions drawn from these inquiries can be helpful, they have had the opposite effect in practice by pushing nearly all process claims to date outside of section 112(f).²²³ In any event, the presumptions are not determinative of the ultimate question as they merely assign the initial burden of proof to one of parties. Regardless of the presumption, the court must still determine whether a function without acts is present.

Moreover, the whole doctrine of presumptions regarding the applicability of section 112(f) is based on a principle taken from

²²² Of course, to accomplish this objective, the Federal Circuit will have to reinterpret the law. In so doing, the court would have to sit en banc to overturn the "steps for" presumption; however, the USPTO has an important role to play as well since it is responsible for administering the statute. As an administrative agency, the USPTO may establish rules and regulations governing its process and procedures. Accordingly, it could establish a new regulation stating how section 112(f) will be applied to process claims during examination moving forward. At the very least, it could adopt guidelines to assist examiners in reviewing process claims for compliance with the statute. As a matter of fact, the USPTO has already issued supplemental guidelines on the examination of product claims with functional language. Providing additional guidelines on the examination of process claims with functional language would be a natural extension of that initiative. In addition to ensuring the development of a clear and complete record on the subject, such measures could potentially fast-track an appeal from a decision by the Office to the Federal Circuit as opposed to waiting for the same issue to arise in litigation involving an existing patent.

²²³ See William Lee & Eugene Paige, *Means Plus and Step Plus Function Claims: Do We Only Know Them When We See Them?* 80 J. PAT. & TRADEMARK OFF. SOC'Y 251, 252 (1998) (suggesting that claim drafters may avoid using express language that would invoke section 112(f) for fear of having such claims narrowly construed during litigation).

means-plus-function case law.²²⁴ In those cases, a product claim is subject to means-plus-function treatment if (i) an element of the claim uses either the term “means for” or a nonstructural term and (ii) such term is described by a function without any structure or material in support thereof.²²⁵ The Federal Circuit has stated that merely using the term “means for” with functional language creates a presumption in favor of applying section 112(f) whereas the failure to use the term triggers the opposite presumption.²²⁶ It explained that “the use of the term ‘means’ has come to be so closely associated with ‘means-plus-function’ claiming that it is fair to say that the use of the term ‘means’ (particularly as used in the phrase ‘means for’) generally invokes” means-plus-function treatment.²²⁷

The rationale for this principle, however, does not necessarily extend to step-plus-function cases. “Although similar,” writes Judge Rader, “means and step-plus-function elements are not identical and require distinct analyses.”²²⁸ Indeed, “steps for” has not become “so closely associated” with step-plus-function claims as to trigger a presumption of any kind. In fact, there is no case on point at the Federal Circuit to suggest such a proposition. Consequently, this presumption as well as the “reverse” presumption should not apply to process claims.²²⁹ Accordingly, the proposed analysis which does away with this presumption is more straightforward than the current one.

Second, the proposed analysis is naturally disposed towards deciphering those process claims at the margins where the limitation recites either a function or an act, but not both. Drawing a distinction between a function and an act is difficult, because the

²²⁴ See *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996) (noting the correlation between the use of “means-for” or “steps for” language and the intent to invoke what is now recognized as § 112(f)).

²²⁵ See *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004).

²²⁶ See *Greenberg*, 91 F.3d at 1584.

²²⁷ *Id.*

²²⁸ *Seal-Flex, Inc. v. Athletic Track & Court Const.*, 172 F.3d 836, 848 (Fed. Cir. 1999).

²²⁹ See MARTIN J. ADELMAN ET AL., *CASES AND MATERIALS ON PATENT LAW* 576 (3d ed. 2009) (questioning the significance of drawing a distinction between the recital of “steps of” and “steps for” on the step-plus-function analysis).

two concepts are substantially similar. As noted above, however, there are differences. The main difference is that a function is merely an abstraction referring to a category of acts, each of which performs the same function. Yet, a function is itself an act. Thus, a limitation may contain a plurality of acts at different levels of abstractness. Nevertheless, where the limitation recites either a function or an act, there is no way to choose one over the other by simply looking at the claim language.

The proposed analysis deals with this problem by providing a solid framework within which each determination must follow. Accordingly, determining whether a process claim limitation is purely functional turns on the overall context of the claim, specification, and prosecution history.²³⁰ Operating within this framework eliminates the tendency for a court to make bold assertions which are inconsistent with the intrinsic evidence.²³¹ As a result, courts are more likely than not to draw one and only one conclusion on whether a process claim limitation is subject to the claim construction requirements of section 112(f). Thus, the proposed analysis is more structured and straightforward than the current analysis.

Third and finally, the proposed analysis is designed to construe and apply the law in a manner consistent with the policy concerns behind section 112(f). As mentioned, there is no way to reasonably determine whether a process claim limitation is described in terms of function only without looking to the specification for the meaning and scope of that language. Requiring courts to review the specification when determining the applicability of this statutory provision would prevent these limitations from being misinterpreted. As a result, courts would be less likely to exempt process claims from step-plus-function treatment in cases where the claim language is nearly identical to

²³⁰ During prosecution, however, the determination would depend only on the claim and the specification. If an examiner determines that the limitation is in step-plus-function form, then the claim should be amended accordingly to indicate to others how the claim has been construed.

²³¹ *Compare* *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 381 F.3d 1371 (Fed. Cir. 2004), *with* *Serrano v. Telular Corp.*, 111 F.3d 1578 (Fed. Cir. 1997) (construing limitations as the recitation of acts without any function even though the specification discloses specific acts for performing those limitations).

that of a corresponding means-plus-function product claim. Accordingly, the proposed analysis is more likely than the current one to result in outcomes where process claims employing purely functional language are cabined by this statutory provision.

CONCLUSION

Section 112(f) has been on the books for more than sixty years. Unfortunately, whether a process claim limitation is written in step-plus-function form remains an unresolved issue due to the lack of Federal Circuit case law in this area. The current framework for analysis needs more structure in making those determinations and less emphasis on following presumptions applied in means-plus-function case law. Absent the necessary framework, patent holders have been able to circumvent the limitations of section 112(f) by claiming a process rather than a product while using essentially the same purely functional language.

As stated, functional claiming is particularly troublesome with software inventions.²³² Computer programmers typically write programs to perform specific functions, so there is a natural tendency to disclose and claim those inventions in terms of functionality. These functional limitations are inherently broad, subject to abuse, and therefore should be limited to the recitation of the structure, material, or acts for achieving a claimed function.²³³ By failing to apply section 112(f), functional claiming impermissibly extends patent protection beyond the disclosed invention and beyond what was intended by the Patent Act.²³⁴

In view of the turmoil surrounding software patent litigation today, it is important to bear in mind that section 112(f) was

²³² See Lemley, *supra* note 31, at 906–07; Brief for the Electronic Frontier Foundation and Public Knowledge as Amicus Curiae at 2, *CLS Bank Int'l v. Alice Corp.*, 685 F.3d 1341 (Fed. Cir. 2012) (No. 2011-1301).

²³³ See, e.g., *Masco Corp. v. United States*, 303 F.3d 1316 (Fed. Cir. 2002) (reversing the district court's claim construction invoking application of section 112(f) after determining that the function of driving the lever into the cam recited in the method claim step was limited by the act of transmitting a force to the lever).

²³⁴ See, e.g., *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 10, 12 (1946); *Cardiac Pacemakers, Inc.*, 381 F.3d 1371.

enacted in response to *Halliburton*. The purpose of this statutory provision was to reinstate the practice of functional claiming, albeit in a particularly confined manner.²³⁵ In exchange for the privilege of employing this claim drafting technique, the scope of claimed subject matter is limited to the corresponding structure, material, or acts in the specification or equivalents thereof.²³⁶

Currently, the validity of software patents is challenged on grounds of section 101 subject matter eligibility. Section 112(f) and appropriate claim construction, however, may provide a better avenue to weed out and curtail patents with process claims that are overbroad and ambiguous, given that this avenue is especially provided for in the statute rather than an undefined, judicially created exception to patentability. To do so, the Federal Circuit must first improve the current analysis in this area of the law.

²³⁵ See *In re Donaldson*, 29 U.S.P.Q. 2d 1845, 1849 (Fed. Cir. 1994).

²³⁶ 35 U.S.C. § 112(f) (2012).