

Functional Claiming of Inventions and Related Issues of Indefiniteness

INTRODUCTION

With the increasingly expanding universe of computers and other microprocessor-based devices, numerous individuals, companies, and other entities have sought protection of their computer-related advancements through patent protection.¹ Typically, the innovation to be protected lies in the functionality of the computer or software, not in the particular machines or hardware that carry it out. Therefore, patent applicants, in seeking broad coverage, may look to protection via use of functional claiming.²

Patent applicants have sought protection using functional claiming for hundreds of years, often without a clear answer to whether such claiming was proper.³ It was not until the Patent Act of 1952 that Congress specifically provided a scheme to allow an individual element of an invention to be claimed using functional language.⁴ This scheme is now codified in 35 U.S.C. § 112(f) and is referred to as means-plus-function and step-plus-function claiming.⁵ And, while use of functional language has been permitted by the statute ever since the 1952 Act, the scope of functionally-defined claim elements are limited by section 112(f) to those certain “structure, material, or acts” that are disclosed in the specification of the patent.⁶ In this way, Congress struck a compromise between allowing claimed elements to be defined functionally and providing reasonable limits on the scope thereof.⁷ Patentees, especially in the realm

1. See Robert Hunt and James Bessen, *The Software Patent Experiment*, FED. RES. BANK PHILA., <https://www.phil.frb.org/-/media/research-and-data/publications/business-review/2004/q3/brq304rh.pdf?la=en> (last visited Jan. 13, 2017).

2. See Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905, 905 (2013) (“Software patent lawyers are increasingly writing patent claims in broad functional terms. Put another way, patentees claim to own not a particular machine, or even a particular series of steps for achieving a goal, but the goal itself. The resulting overbroad patents overlap and create patent thickets.”).

3. Brad A. Schepers, *Interpretation of Patent Process Claims in Light of the Narrowing Effect of 35 U.S.C. § 112(6)*, 31 IND. L. REV. 1133, 1139 (1998).

4. Patent Act of 1952, ch. 950, § 1, 66 Stat. 798 [hereinafter Patent Act of 1952] (codified as 35 U.S.C. § 112 (1952)).

5. Title 35 § 112, paragraph 3 later became § 112, paragraph 6 and, then, after the Leahy-Smith America Invents Act (AIA), was renumbered to be § 112(f). As used herein, 35 U.S.C. § 112(f) will refer to the means-plus-function section, which may have a different designation in the code depending on the year.

6. 35 U.S.C. § 112(f) (2012). Although section § 112(f) limits the functional element to those structures, materials, or acts and their equivalents, what constitutes “equivalents” is outside the scope of this discussion.

7. See Lemley, *supra* note 2, at 905 (“When Congress rewrote the Patent Act in 1952, it adopted a compromise position: patentees could write their claim language in functional terms, but when they did so the patent would not cover the goal itself, but only

of computer-related inventions where innovations are substantially if not entirely functional, have sought to avoid the limiting effect of § 112(f) by creative drafting of claim language so as to claim that innovative functionality per se. In response, the courts have adopted new approaches and guidelines for interpreting functional limitations. This Note discusses these judicial changes.

Section 112(f) traditionally has been invoked by a judicially-created presumption that the section applies when a claim uses the word “means” or “step” followed by a recited function (“presumption for invocation”).⁸ Likewise, there has evolved an opposite presumption that when these terms are not used, section 112(f) does not apply (“presumption against invocation”).⁹ For over a decade from 2004-2014, the strength of the presumption against invocation had been increasing.¹⁰ In *Williamson v. Citrix Online*, the Federal Circuit returned to a weaker standard of this presumption.¹¹ This return to the weaker standard, as discussed more below, was due at least in part to recent claim drafting practices that sought to use functional claiming without subjecting the functional claim terms to the narrowing effects of § 112(f).

The topics addressed herein involve: (1) understanding current law relating to functional claims with regard to 35 U.S.C. § 112(f) and how to anticipate invocation of § 112(f); (2) the current law on indefiniteness as it relates to § 112(f); (3) how to mitigate the chances of invalidity of claims due to improper use of § 112(f) or the narrowing effects that may attributed thereto; and (4) how one may still obtain broad coverage using functional limitations in light of § 112(f).

To begin, a brief background of functional claiming is provided along with a brief history of § 112(f) to provide some context. Recent case law involving the invocation of § 112(f) leading up to and including the landmark case of *Williamson v. Citrix Online*¹² is discussed, as well as the

the particular means of implementing that goal described by the patentee and equivalents thereof.”). See also *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1347 (Fed. Cir. 2015) (en banc) (“In enacting this provision, Congress struck a balance in allowing patentees to express a claim limitation by reciting a function to be performed rather than by reciting structure for performing that function, while placing specific constraints on how such a limitation is to be construed, namely, by restricting the scope of coverage to only the structure, materials, or acts described in the specification as corresponding to the claimed function and equivalents thereof.”).

8. Means-plus-function claiming has received much more attention than step-plus-function claiming and, except as specifically addressed herein, the discussion of means-plus-function will apply *mutatis mutandis* to step-plus-function claiming.

9. Dennis Crouch, *Means Plus Function Claiming*, PATENTLY-O (Jan. 14, 2013), <http://patentlyo.com/patent/2013/01/means-plus-function-claiming.html>.

10. See *infra* notes 40-42 and accompanying text.

11. *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1349 (Fed. Cir. 2015) (en banc).

12. *Id.*

current law regarding indefiniteness under § 112(b), particularly in light of the recent holding in *Nautilus, Inc. v. Biosig Instruments, Inc.*,¹³ and how it relates to § 112(f). Thereafter, a case-driven analysis of issues surrounding the presumption against invocation of § 112(f) will be provided. This case-driven analysis will include an inquiry into some recent cases and their reasoning with respect to “nonce” terms, that is, terms selected specifically for writing functional claims without the use of the word “means,” and, additionally, a look at what constitutes sufficient “structure, material, or acts” for purposes of definiteness of a means-plus-function limitation. Finally, certain approaches will be introduced that may be taken to address indefiniteness issues with respect to functional claiming, namely, potential strategies of how one may draft a broad claim while still satisfying the courts’ preemption concerns.

I. FUNCTIONAL CLAIMING BACKGROUND

Functional claiming arises when an element of a claimed invention is defined by claim limitations that describe what it does or its “function,” rather than what it is or how it is physically constructed. Thus, a purely functional claim limitation by its own terms literally covers every possible way of performing the recited function and, in many cases, this results in very broad claim limitations which are desirable for patent applicants. However, the use of functional claiming may subject a claim to be rejected or invalidated for failing to “particularly point[] out and distinctly claim[] the subject matter,”¹⁴ as required by 35 U.S.C. § 112(b).

Prior to 1946, functional claims were handled inconsistently;¹⁵ and thereafter, due to the decision of the Supreme Court case of *Halliburton Oil Well Cementing Co. v. Walker*, purely functional language was held to be indefinite, resulting in invalidity of the claim altogether.¹⁶ Thus, 35 U.S.C. § 112, paragraph 3 (which later became § 112, paragraph 6, then § 112(f)) was enacted by Congress to overrule *Halliburton* and allow patentees to use functional language by drafting claimed elements of a combination in means-plus-function and step-plus-function format.¹⁷ This section states:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be

13. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120 (2014).

14. 35 U.S.C. § 112(b) (2012).

15. Schepers, *supra* note 3, at 1139.

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

17. Patent Act of 1952. See *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1582 (Fed. Cir. 1996) (“Congress enacted paragraph six, originally paragraph three, to overrule that holding.”); *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1357 (Fed. Cir. 2015) (en banc) (“it is generally accepted that § 112, para. 6 was passed in response to the Supreme Court’s decision in *Halliburton*”).

construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.¹⁸

This new provision allows inventors to intentionally use this claim drafting approach by invoking § 112(f) using the terms “means for” or “step for” followed by a specified function.

This section permitted patentees to express claim elements in terms of their functionality while providing that the “means” or “step” for doing so is thereby limited to those “structures, materials, and acts” provided in the specification or their equivalents.¹⁹ If no such corresponding “structures, materials, or acts” are provided in the specification, the claim will be invalidated as indefinite under § 112(b), for failing to “particularly point[] out and distinctly claim[] the subject matter”²⁰ Generally, structure and materials will be imparted on the scope of “means” terms in an apparatus claim and acts²¹ will be imparted on the scope of “step for” terms in a process claim.²²

As mentioned, § 112(b) seeks to ensure that the scope of the claims is reasonably definite, while § 112(f) provides a mechanism for interpreting means-plus-function elements in such a way as to curtail indefiniteness issues that may arise due to the functional language. The mere existence of a functional claim element does not necessarily mean that its scope is indefinite, but functional claim elements may pose other issues. As stated in *Halliburton*,²³ the Court feared that a claim involving broad functional elements would preempt too large of an area of emerging technology, namely technologies that had not been invented yet and that involve concepts not sufficiently disclosed in the specification.²⁴

18. 35 U.S.C. § 112(f) (2012); 35 U.S.C. § 112, para. 6 (2006). In 2012, the Leahy-Smith America Invents Act of 2011 renumbered 35 U.S.C. to include characters to identify subsections within sections that contain multiple paragraphs.

19. 35 U.S.C. § 112(f) (2012).

20. 35 U.S.C. § 112(b) (2012). Although definiteness and patentability are two distinct aspects of Patent Law, there exists a fundamental interrelationship between them, which is recognized by the Manual of Patent Examining Procedure (MPEP): “A secondary purpose [of § 112(b)] is to provide a clear measure of what applicants regard as the invention so that it can be determined whether the claimed invention meets all the criteria for patentability.” MPEP § 2173 (9th ed. Rev. 7, Nov. 2015).

21. See *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1582-83 (Fed. Cir. 1997) (“We interpret the term ‘steps’ to refer to the generic description of elements of a process, and the term ‘acts’ to refer to the implementation of such steps.”), *amended by reh’g en banc*.

22. See ROBERT L. HARMON, *PATENTS AND THE FEDERAL CIRCUIT* 438 (Bureau of Nat’l Affairs Inc., 12th ed. 2016) (“The analysis is interesting: structure and material go with means, and acts go with steps.”).

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

24. *Id.* at 12 (“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.”) (citations omitted).

Not all claims that include functional limitations require means-plus-function treatment. Thus, the first step becomes determining whether § 112(f) applies (i.e., whether § 112(f) is invoked). It is the province of the court to determine whether a claim limitation is in means-plus-function or step-plus-function format.²⁵

The step-plus-function moiety of § 112(f) has not received nearly as much attention as means-plus-function constructions. Nonetheless, there have been a few cases that have discussed step-plus-function constructions and the conditions under which it is invoked.²⁶ In *Cardiac Pacemakers*,²⁷ the Federal Circuit stated,

[T]he preamble words that “the method comprises the steps of” do not automatically convert each ensuing step into the form of § 112 ¶ 6. Nor does the preamble usage “steps of” create a presumption that each ensuing step is in step-plus-function form; to the contrary, the absence of the signal ‘step for’ creates the contrary presumption.²⁸

In accord with *Cardiac Pacemakers*, the Federal Circuit stated a year later in *Respirionics* that “the method steps lack the words ‘step for,’ thus triggering a presumption that § 112 ¶ 6 does not apply to the method steps.”²⁹ Another theme regarding step-plus-function constructions announced by the Federal Circuit is that the “fact that a method claim is drafted with language parallel to an apparatus claim with means-plus-function language does not mean that the method claim should be subject to an analysis under § 112, paragraph 6.”³⁰

The means-plus-function component of § 112(f) has received much Federal Circuit attention. Recently, a major topic of interest among cases involving functional claiming has involved the presumption against invocation of § 112(f). The Federal Circuit created this presumption, which states that “the failure to use the word ‘means’ . . . creates a

25. HARMON, *supra* note 22, at 424; *see also* *Advanced Ground Info. Sys., Inc. v. Life360, Inc.*, 830 F.3d 1341, 1346 (Fed. Cir. 2016) (“The district court’s construction of patent claims based on evidence intrinsic to the patent, including any finding that the claim language invokes 35 U.S.C. § 112, ¶ 6, is reviewed de novo as a question of law.”) (citation omitted).

26. *See* Paul R. Kitch, *Step-Plus-Function: Just What Have We Stepped Into?*, 7 JOHN MARSHALL REV. OF INTELL. PROP. L. 117, 118 (2007) (“The Federal Circuit did not rule on whether a limitation was a step-plus-function limitation until 1997. Since that time, the Federal Circuit has substantively addressed potential step-plus-limitations in only seven more cases plus once in a concurring opinion.”) (footnotes omitted).

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

28. *Id.* at 1382.

29. *Respirionics, Inc. v. Invacare Corp.*, 303 Fed. App’x 865, 876 (Fed. Cir. 2008).

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

rebuttable presumption . . . that § 112, para. 6 does not apply.”³¹ The presumption is rebuttable and the determination of whether the presumption has been rebutted focuses on “whether the claim as properly construed recites *sufficiently definite structure*.”³²

Since *Valmont Indus., Inc. v. Reinke Mfg. Co.*, a Federal Circuit case limiting what constitutes an equivalent of the “structure, materials, and acts” for purposes of construing the means-plus-function element,³³ the percent of issued patents containing “means” elements in an independent claim has decreased from about 50% in 1994 to less than 5% in 2014.³⁴ Nonetheless, patent applicants have not forgotten about functional claiming, but instead have changed their claim drafting form in an attempt to “integrate functional limitations together with structural limitations with the result being broadly defined claim elements that avoids the limitations of 112(f).”³⁵

II. RECENT STATE OF 35 U.S.C. § 112(F)

The increase in computer technologies along with the new guidelines introduced by the PTO regarding § 112(f) have induced patent applicants to be strategic in drafting their claims. This response by applicants has spawned the use of new functional terminology.³⁶ New “nonce” terms, terms that are generic nouns used as placeholders for “means,”³⁷ have prompted the court to analyze the presumption against invocation.³⁸ The

31. *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (en banc) (citing *Personalized Media Commc’ns, L.L.C. v. Int’l Trade Comm’n*, 161 F.3d 696, 703-04 (Fed. Cir. 1998)); see *Personalized Media Commc’ns*, 161 F.3d at 703-04 (“Subsequent cases have clarified that use of the word ‘mean’ creates a presumption that § 112, ¶ 6 applies . . . and that the failure to use the word ‘means’ creates a presumption that § 112, ¶ 6 does not apply.”).

32. *Personalized Media Commc’ns*, 161 F.3d at 704 (emphasis added); see *Sage Prods. v. Devon Indus., Inc.*, 126 F.3d 1420, 1427–28 (Fed. Cir. 1997) (“[Although a claim uses the word ‘means’.] where [the] claim recites a function, but then goes on to elaborate sufficient structure, material, or acts within the claim itself to perform entirely the recited function, the claim is not in means-plus-function format”).

33. *Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1043 (Fed. Cir. 1993) (“In the context of section 112, however, an equivalent results from an insubstantial change which adds nothing of significance to the structure, material, or acts disclosed in the patent specification.”).

34. Dennis Crouch, *The Vast Middle Ground of Hybrid Functional Claim Elements*, PATENTLY-O (Oct. 20, 2014), <http://patentlyo.com/patent/2014/10/hybrid-functional-elements.html>.

35. *Id.*

36. *Id.* (A graph is provided of functional claim language that is used in issued patents and which shows the percentage of issued patents that include at least one independent claim containing a “configured to” or “configured for” element increased from less than 4% in 1994 to about 20% in 2013.)

37. MPEP § 2181 (9th ed. Rev. 7, Nov. 2015).

38. See *infra* notes 40-72 and accompanying text.

Manual of Patent Examining Procedure (“MPEP”) lists some of these “nonce” words: “mechanism,” “module,” “unit,” “component,” “element,” “member,” “apparatus,” “machine,” and “system.”³⁹

In 2004, the Federal Circuit in *Lighting World* strengthened the presumption against invocation by holding that it “is a strong one that is not readily overcome.”⁴⁰ Eight years later, this presumption was strengthened even further in *Flo Healthcare Solutions* wherein the court held that the presumption may only be overcome by “a showing that the limitation essentially is devoid of anything that can be construed as structure.”⁴¹ This was recently reaffirmed in *Apple Inc. v. Motorola, Inc.*, wherein the court also noted that the Federal Circuit has “‘seldom’ held that a limitation without recitation of ‘means’ is a means-plus-function limitation.”⁴²

In *Williamson v. Citrix Online*, a 2014 *en banc* decision by the Court of Appeals for the Federal Circuit, the court reiterated that terms that are “simply a generic description for software or hardware that performs a specified function [are] nothing more than verbal constructs [that] may be used in a claim in a manner that is tantamount to using the word ‘means’ . . . and therefore may invoke § 112, para. 6.”⁴³ These verbal constructs are referred to as “nonce” words.⁴⁴

As the court in *Williamson* recognizes, the Federal Circuit’s “opinions in *Lighting World*, *Inventio*, *Flo Healthcare* and *Apple* have thus established a heightened bar to overcoming the presumption that a limitation expressed in functional language without using the word ‘means’ is not subject to § 112, para. 6.”⁴⁵ Nonetheless, the Federal Circuit concluded that “such a heightened burden is unjustified and that we should abandon characterizing as ‘strong’ the presumption that a limitation lacking the word ‘means’ is not subject to § 112, para. 6.”⁴⁶ This effectively overruled the contrary holdings in *Lighting World* and *Apple*.⁴⁷ The court

39. MPEP § 2181 (9th ed. Rev. 7, Nov. 2015).

40. *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004), *overruled by Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (*en banc*); *see Inventio AG v. ThyssenKrupp Elevator Americas Corp.*, 649 F.3d 1350, 1358 (Fed. Cir. 2011) (“[The presumption of using the term ‘means’] is a strong one that is not readily overcome.”), *overruled by Williamson*, 792 F.3d 1339 (Fed. Cir. 2015) (*en banc*).

41. *Flo Healthcare Solutions, L.L.C. v. Kappos*, 697 F.3d 1367, 1374 (Fed. Cir. 2012).

42. *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1297 (Fed. Cir. 2014) *overruled by Williamson*, 792 F.3d 1339 (Fed. Cir. 2015) (*en banc*).

43. *Williamson, L.L.C.*, 792 F.3d at 1350.

44. *Id.*

45. *Id.* at 1349.

46. *Id.*

47. *Id.*

did not provide much, if any, rationale for its holding, but simply concluded that this heightened presumption was “unjustified.”⁴⁸

Judge Reyna, who concurred-in-part and dissented-in-part, stated,

What arguably changes is the *weight* we attach to different recitations in meeting this test: “means” weighs heavily, non-structural terms like “module” weigh a little less, and, at the other end of the spectrum, purely structural terms weigh heavily in the opposite direction.⁴⁹

Judge Newman dissented and gave numerous rationales for her dissent.⁵⁰ First, Judge Newman argues that “judicial interpretation is unnecessary” since the statute is clear in that “[t]o claim an element by the function performed, the element is ‘expressed as’ a ‘means for,’ as the statute provides.”⁵¹ Moreover, she argued that the “means for” signal is clear and that the court’s holding will cause everyone to guess whether § 112(f) is to be invoked.⁵² Judge Newman also recognized the departure from the precedential history: “The court now overrules dozens of cases referring to a ‘strong presumption’ of means-plus-function usage, and goes to the opposite extreme, holding that this court will create such usage from generic terms such as ‘mechanism,’ ‘element,’ ‘device,’ and other nonce words.”⁵³ She also points to the legislation history of § 112(f)⁵⁴ and the examinations guidelines set forth by the Patent and Trademark Office.⁵⁵

In addition to quashing the “strong” rebuttable presumption against invocation, the court in *Williamson* said that:

Generic terms such as “mechanism,” “element,” “device,” and other nonce words that reflect nothing more than verbal constructs may be used in a claim in a manner that is tantamount to using the word “means” because they “typically do not connote sufficiently definite structure” and therefore may invoke § 112, para. 6.⁵⁶

In *Williamson*, the court found that the claim term “distributed learning control module”⁵⁷ invokes means-plus-function treatment because there

48. *Id.*

49. *Williamson*, 792 F.3d at 1357 (Reyna, J., dissenting).

50. *Id.* at 1358 (Newman, J., dissenting).

51. *Id.* at 1358-59 (Newman, J., dissenting). *See id.* at 1362 (“The examiner must guess whether the term is intended as a means-plus-function term, now that the court holds that the signal “means for” need not be used. Paragraph 6 has morphed from a clear legal instruction into a litigator’s delight.”).

52. *Id.* at 1358 (Newman, J., dissenting).

53. *Id.* (Newman, J., dissenting) (internal quotations omitted).

54. *Id.* at 1360-61 (Newman, J., dissenting).

55. *Williamson*, 792 F.3d at 1361-62 (Newman, J., dissenting).

56. *Id.* at 1350 (Here, the generic term in question was “module.”).

57. In *Williamson*, the court observed that the whole claim limitation in question was not merely “distributed learning control module,” but “distributed learning control module for receiving communications transmitted between the presenter and the audience member

was no definite structure defined in the claim. The Federal Circuit stated, “the word ‘module’ does not provide any indication of structure because it sets forth the same black box recitation of structure for providing the same specified function as if the term ‘means’ had been used.”⁵⁸

In his support for rejecting the strong presumptions regarding invocation of means-plus-function treatment, Judge Reyna looked to *Halliburton*, the case that gave rise to the codification of means-plus-function claiming.⁵⁹ In *Halliburton*, the Supreme Court “relied on precedent invalidating functional claims that did not recite the term ‘means.’”⁶⁰

After finding that Williamson’s claims were subject to § 112(f) treatment, the Federal Circuit looked to the specification for corresponding structure.⁶¹ “Once a court establishes that a [means-plus-function] limitation is at issue, it must construe that limitation, thereby determining what the claimed function is and what structures disclosed in the written description correspond to the ‘means’ for performing that function.”⁶² The court there found that there was no structure corresponding to one of the functions provided for in the claim and, due to this, the claim was indefinite.⁶³ Therefore, the claim was invalidated for being indefinite.⁶⁴

As illustrated, not only may an issued patent be narrowly construed due to means-plus-function treatment, but it also may be invalidated altogether. The consequences may be drastic in cases of unintentional invocation of § 112(f) which was exacerbated in *Williamson* by the sudden departure from the previously strong presumption against invocation.⁶⁵ Moreover, this ruling reiterates the concept that “nonce” words may also, quite easily, lead to § 112(f) invocation. The only guidance as to what constitutes a “nonce” word for purposes of § 112(f) was that which was

computer systems and for relaying the communications to an intended receiving computer system and for coordinating the operation of the streaming data module.” *Id.*

58. *Id.*

59. See *supra* notes 16-17 and accompanying text.

60. *Williamson*, 792 F.3d at 1358 (citing *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 9 (1946) (citing *Holland Furniture Co. v. Perkins Glue Co.*, 277 U.S. 245, 256-57 (1928))).

61. See HARMON, *supra* note 22, at 426. (“Structural aspects that are unrelated to the recited function are not what the statute contemplates as structure corresponding to the recited function. Corresponding structure need not include all things necessary to enable the claimed invention to work, but it must include all structure that actually performs the recited function.”) (internal citations omitted).

62. HARMON, *supra* note 22, at 424.

63. See 35 U.S.C. § 112(b) (2012).

64. See HARMON, *supra* note 22, at 426 n.218 (2015) (“If the specification does not adequately disclose a particular structure as that which performs the recited function, then the claim does not particularly point out and distinctly claim that particular means.”). See 35 U.S.C. § 112(b) (2012).

65. *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1349 (Fed. Cir. 2015).

provided in *Lighting World* and restated in *Williamson* and its predecessors. This standard merely stated, “What is important is whether the term is one that is understood to describe structure, as opposed to a term that is simply a nonce word or a verbal construct that is not recognized as the name of structure and is simply a substitute for the term ‘means for.’”⁶⁶ The difficulty for the claim drafter becomes, at least in part, determining whether “one skilled in the art” would interpret the claim to denote sufficient structure.

“Sufficient structure” means more than simply using a generic word such as “module,” “mechanism,” or “component”; however, it does not mean “that a claim need . . . recite every last detail of structure disclosed in the specification for performing the claimed function.”⁶⁷ Moreover, the structure “is sufficient if the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the term identifies the structures by their function.”⁶⁸ A question that arises is what constitutes sufficient structure with regard to computers and computer-related technology. As discussed in more detail below, reciting a general-purpose computer may not be enough.⁶⁹

Understanding what constitutes “sufficient structure”⁷⁰ for purposes of determining whether § 112(f) applies, and for purposes of determining whether the claim is definite under § 112(b) after invocation of § 112(f), may prove critical in drafting a patent.⁷¹ For example, when drafting an apparatus claim, a claim drafter wishing to avoid § 112(f) treatment should be careful when using broad or generic terms to describe an element that performs a function so as to protect against the claim limitation being construed as invoking § 112(f). Additionally, a claim drafter who intentionally invokes § 112(f) will necessarily have to include sufficient

66. *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1360 (Fed. Cir. 2004), *overruled by Williamson*, 792 F.3d 1339 (Fed. Cir. 2015) (en banc); *Mass. Inst. of Tech. & Elecs. For Imaging, Inc. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006); *Welker Bearing Co. v. PHD, Inc.*, 550 F.3d 1090, 1096 (Fed. Cir. 2008); *Flo Healthcare Sols., L.L.C. v. Kappos*, 697 F.3d 1367, 1374-75 (Fed. Cir. 2012), *overruled by Williamson*, 792 F.3d 1339; *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1299 (Fed. Cir. 2014), *overruled by Williamson*, 792 F.3d 1339; *Robert Bosch, L.L.C. v. Snap-On Inc.*, 769 F.3d 1094, 1099 (Fed. Cir. 2014). Please note that, although *Williamson* overruled several of these cases, it did not overrule this presupposition.

67. See HARMON, *supra* note 22, at 435. See *Lighting World*, 382 F.3d at 1359 (“In considering whether a claim term recites sufficient structure to avoid application of section 112 ¶ 6, we have not required the claim term to denote a specific structure.”).

68. *Lighting World*, 382 F.3d at 1359-60.

69. See *infra* pp. 25-30 and notes 140-68.

70. 35 U.S.C. § 112(f) (2012).

71. It should be appreciated that the “sufficient structure” standard for analyzing whether § 112(f) applies is different, or at least not necessarily the same, than the standard used under § 112(b) after it has been determined that § 112(f) applies.

“structure, material, or acts” in the specification such that their means-plus-function (or step-plus-function) claims are not invalidated as being indefinite under 35 U.S.C. § 112(b).⁷²

III. THE CURRENT DEFINITENESS REQUIREMENT OF § 112(B)

Section 112(b) specifies the definiteness requirement for claims. The Patent Clause of the Constitution grants a limited monopoly to the patentee.⁷³ “The monopoly is a property right; and like any property right, its boundaries should be clear.”⁷⁴ As the Supreme Court in *Festo* points out, “[t]his clarity is essential to promote progress, because it enables efficient investment in innovation.”⁷⁵ Moreover, the Court states, “A patent holder should know what he owns, and the public should know what he does not.”⁷⁶ This idea of defining the “metes and bounds” of what the patentee seeks to claim a monopoly in is codified in § 112(b), which states, “The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.”⁷⁷

As mentioned above, when § 112(f) is invoked, the specification must disclose “sufficient structure” such that the means-plus-function claim limitation satisfies § 112(b):

[I]n order for a claim to meet the particularity requirement of [§ 112(b)], the corresponding structure(s) of a means-plus-function limitation must be disclosed in the written description in such a manner that one skilled in the art will know and understand what structure corresponds to the means limitation. Otherwise, one does not know what the claim means.⁷⁸

It is the claims that define the scope and subject matter of the patent. Therefore, the claims are the part of the patent that needs to be sufficiently definite “to give notice of the scope of the patent protection, both to the examiner at the PTO during prosecution, and to the public at large,

72. *See* *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014) (“[W]e hold that a patent is invalid for indefiniteness [under § 112(b)] if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.”).

73. U.S. CONST. art. I, § 8, cl. 8.

74. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 730 (2002).

75. *Id.* at 730-31.

76. *Id.* at 731.

77. 35 U.S.C. § 112(b) (2012).

78. *Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1382 (Fed. Cir. 1999). MPEP § 2173 (9th ed. Rev. 7, Nov. 2015) (“The primary purpose of this requirement of definiteness of claim language is to ensure that the scope of the claims is clear so the public is informed of the boundaries of what constitutes infringement of the patent.”).

including potential competitors, after the patent has issued.”⁷⁹ The MPEP instructs examiners to determine whether the claims are definite under their “broadest reasonable interpretation” in light of the specification.⁸⁰

The definiteness requirement is a question of law and, thus, may be reviewed *de novo* by the Federal Circuit.⁸¹ This question of law is decided from the perspective of one skilled in the relevant art at the time of filing and in light of the patent’s specification and prosecution history.⁸² Until it was overruled by a recent Supreme Court case, *Nautilus*, the Federal Circuit held that claims were indefinite if they were “not amenable to construction” or “insolubly ambiguous.”⁸³ However, in *Nautilus*, the Court evaluated the standard used by the Federal Circuit and then concluded by stating a new standard: “[W]e hold that a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, *with reasonable certainty*, those skilled in the art about the scope of the invention.”⁸⁴

Applying this new standard to the “sufficient structure” inquiry discussed above with respect to § 112(f), the question becomes: Does the specification contain “sufficient structure” for the functional element such that the claim, when read in light of the specification and the prosecution history, informs with reasonable certainty, those skilled in the art about the scope of the invention?⁸⁵

IV. SECTION 112(F) APPLIED BY THE COURTS

Although means-plus-function constructions and tests for definiteness are to be analyzed by the courts on a case-by-case basis, analogous case law may inform a patentee or other member of the public as to how a particular claim may be construed or how a court would determine its validity. There have been numerous cases heard by the Federal Circuit where a § 112(f) question was posed concerning functional claim

79. See HARMON, *supra* note 22, at 353. See also MPEP § 2173 (9th ed. Rev. 7, Nov. 2015) (“The primary purpose of this requirement of definiteness of claim language is to ensure that the scope of the claims is clear so the public is informed of the boundaries of what constitutes infringement of the patent. A secondary purpose is to provide a clear measure of what applicants regard as the invention so that it can be determined whether the claimed invention meets all the criteria for patentability and whether the specification meets the criteria of 35 U.S.C. 112(a) or pre-AIA 35 U.S.C. 112, first paragraph with respect to the claimed invention.”).

80. See MPEP § 2173 (9th ed. Rev. 7, Nov. 2015)

81. *In re Warmerdam*, 33 F.3d 1354, 1361 (Fed. Cir. 1994) (“The ultimate conclusion of indefiniteness is one of law, which we are free to review anew on appeal.”).

82. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2128 (2014).

83. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 715 F.3d 891, 898 (Fed. Cir. 2013), *vacated*, *Nautilus*, 134 S. Ct. 2120 (2014).

84. *Nautilus*, 134 S. Ct. at 2124 (emphasis added).

85. *Id.*

limitations. Such cases involve a plurality of different issues, such as those relating to (A) “nonce” terms and the presumption against invocation and (B) what constitutes sufficient “structure, material, or acts”⁸⁶ for purposes of definiteness.

A. *Nonce Terms and the Strength of their § 112 Implications*

As stated above, *Williamson* weakened the presumption against invocation when the word “means” is not used.⁸⁷ In doing so, *Williamson* recognized the use of “nonce” words as placeholders for the term “means” and, thus, when a nonce word is used in place of “means” such that the word “does not provide any indication of structure because it sets forth the same black box recitation of structure for providing the same specified function as if the term ‘means’ had been used,” then § 112(f) is invoked.⁸⁸ The Federal Circuit has identified many “nonce” terms;⁸⁹ however, one should note that a “nonce” term must be viewed in the context of the rest of the patent.

Although *Williamson* changed the strength of the presumption against mean-plus-function invocation, the determination of whether § 112(f) applies when the word “means” is not used is still subject to the same analysis. The following section details some Federal Circuit cases regarding analysis on making a determination of whether § 112(f) is invoked.

In 1996, before *Lighting World* strengthened the presumption of § 112(f) applicability in the absence of the term means,⁹⁰ the court in *Greenberg* held that the term “detent mechanism” was determined to have “a generally understood meaning in the mechanical arts, even though the definitions are expressed in functional terms.”⁹¹ In doing so, the court recognized that “the fact that a particular mechanism—here ‘detent mechanism’—is defined in functional terms is not sufficient to convert a

86. 35 U.S.C. § 112(f) (2012).

87. See *supra* note 11 and accompanying text.

88. *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1350 (Fed. Cir. 2015) (en banc).

89. MPEP § 2181 (9th ed. Rev. 7, Nov. 2015) (“The following is a list of non-structural generic placeholders that may invoke 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, paragraph 6: ‘mechanism for,’ ‘module for,’ ‘device for,’ ‘unit for,’ ‘component for,’ ‘element for,’ ‘member for,’ ‘apparatus for,’ ‘machine for,’ or ‘system for.’”).

90. *Lighting World*, 382 F.3d at 1358, *overruled by Williamson*, 792 F.3d 1339 (Fed. Cir. 2015) (en banc); see *Inventio AG v. ThyssenKrupp Elevator Americas Corp.*, 649 F.3d 1350, 1358 (Fed. Cir. 2011) (“[The presumption of using the term ‘means’] is a strong one that is not readily overcome.”), *overruled by Williamson*, 792 F.3d 1339 (Fed. Cir. 2015) (en banc).

91. *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996).

claim element containing that term into a ‘means for performing a specified function’ within the meaning of section 112([f]).”⁹²

A couple of years later, in *Personalized Media Commc’ns*, the Federal Circuit held that the term “digital detector” did not invoke § 112(f) because the term “had a well-known meaning to those of skill in the electrical arts connotative of structure, including a rectifier or demodulator.”⁹³ The court further went on to state that “an adjectival qualification (‘digital’) placed upon otherwise sufficiently definite structure (‘detector’) does not make the sufficiency of that structure any less sufficient for purposes of § 112, ¶ 6.”⁹⁴

That same year, in *Mas-Hamilton Group*, the limitation “*a substantially non-resilient lever moving element* for moving the lever from its disengaged position”⁹⁵ was held to invoke § 112(f) even though the word “means” was not used. The court reasoned that if the claim element was not limited to the structures disclosed in the specification and the equivalents thereof, then the limitation “moving element” would effectively cover everything that may “cause a lever to move.”⁹⁶ The court implicitly stated that the term “element” without more has no associated structure and is, therefore, equivalent to using the term “means.” Also, in *Mas-Hamilton Group*, the court determined that the element “*a movable link member* for holding the lever out of engagement with the cam surface before entry of a combination and for releasing the lever after entry of the combination” invoked means-plus-function treatment as well.⁹⁷

92. *Id.* at 1583 (“Many devices take their names from the functions they perform. The examples are innumerable, such as ‘filter,’ ‘brake,’ ‘clamp,’ ‘screwdriver,’ or ‘lock.’ Indeed, several of the devices at issue in this case have names that describe their functions, such as ‘graspers,’ ‘cutters,’ and ‘suture applicators.’”).

93. *Personalized Media Commc’ns, L.L.C. v. Int’l Trade Comm’n*, 161 F.3d 696, 704-05 (Fed. Cir. 1998).

94. *Id.* at 705 (“Instead, it further narrows the scope of those structures covered by the claim and makes the term more definite. The use of the word ‘digital’ in conjunction with the word ‘detector’ merely places an additional functional constraint (extraction of digital information) on a structure (detector) otherwise adequately defined.”).

95. *Mas-Hamilton Grp. v. LaGard, Inc.*, 156 F.3d 1206, 1213 (Fed. Cir. 1998) (Note, the entire limitation was “*a substantially non-resilient lever moving element* for moving the lever from its disengaged position for engaging the protrusion of the lever with the cam surface on the cam wheel so that the rotation of the cam wheel thereafter in the given direction changes the locking mechanism from the locked condition to the unlocked condition.”).

96. *Id.* at 1214 (“If we accepted [the patentee’s] argument that we should not apply section 112, ¶ 6, a ‘moving element’ could be any device that can cause the lever to move.”).

97. *Id.* at 1215 (“Further, we do not see that the remaining terms in the claim limitation other than those defining the two functions, *i.e.*, ‘a movable link member,’ provide any structure as necessary to remove this limitation from the ambit of section 112, ¶ 6.”); *cf.* *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359 (Fed. Cir. 2002) (holding that the term “reciprocating member” did not invoke means-plus-function treatment).

In *Al-Site Corp.*,⁹⁸ a Federal Circuit case from 1999, the court held that “eyeglass hanger member” did not invoke § 112(f). Here, the court looked to the specification and determined that the “eyeglass hanger member” is “‘made from flat sheet material’ with an ‘opening means formed . . . below [its] upper edge.’”⁹⁹ A few years later, in *CCS Fitness*,¹⁰⁰ the court stated that the term “reciprocating member” did not invoke means-plus-function treatment because “the dictionary definitions of ‘member’ show that an artisan of ordinary skill would understand this term to have an ordinary meaning and to connote beam-like structures.”¹⁰¹ The court further stated that:

in addition to the structure suggested by these dictionary definitions . . . , the claims themselves describe the “member” as having a “rear support and a front end” with one end of this structure circulating around a crankshaft and the other having wheels so that it can “rollably engage the base portion” of the claimed invention.¹⁰²

The court in *CCS Fitness* concluded by stating, “This suffices for purposes of § 112 ¶ 6 and the presumption thereto, since a term need not connote a precise physical structure in order to avoid the ambit of that provision.”¹⁰³

In *Massachusetts Institute of Technology*,¹⁰⁴ the Federal Circuit agreed with the district court’s conclusion that “colorant selection mechanism” invoked means-plus-function treatment.¹⁰⁵ Although they held that in the present case § 112(f) was invoked, the court recognized that “[c]laim language that further defines a generic term like ‘mechanism’ can sometimes add sufficient structure to avoid 112 ¶ 6.” The court then cited *Greenberg* and discussed how the word “detent” qualified the following word “mechanism” such that enough structure was disclosed to not invoke means-plus-function treatment. However, the court distinguished the current case with *Greenberg*: “In contrast, the term ‘colorant selection,’ which modifies ‘mechanism’ here, is not defined in the specification and has no dictionary definition, and there is no suggestion that it has a generally understood meaning in the art.”¹⁰⁶

98. *Al-Site Corp. v. VSI Intern., Inc.*, 174 F.3d 1308 (Fed. Cir. 1999).

99. *Id.* at 1318.

100. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359 (Fed. Cir. 2002).

101. *Id.* at 1369.

102. *Id.* at 1370.

103. *Id.*

104. *Mass. Inst. of Tech. & Elecs. For Imaging, Inc. v. Abacus Software*, 462 F.3d 1344 (Fed. Cir. 2006).

105. *Id.* at 1354.

106. *Id.* at 1354. *See Mass. Inst. Of Tech.*, 462 F.3d at 1354-55 (holding the term “aesthetic correction circuitry” “connotes sufficient structure to avoid 112 ¶ 6 treatment.” “In contrast to the term ‘mechanism,’ dictionary definitions establish that the term ‘circuitry,’ by itself, connotes structure.”). *See also Welker Bearing Co. v. PHD, Inc.*, 550

In *Inventio AG v. ThyssenKrupp Elevator Americas Corp.*, a case overruled by *Williamson*, the court determined that “modernizing device” does not invoke § 112(f) because the claims “delineate the components that the modernizing device is connected to, describe how the modernizing device interacts with those components, . . . describe the processing that the modernizing device performs[, and t]he written descriptions additionally show that the modernizing device conveys structure to skilled artisans.”¹⁰⁷ Specifically, the court found that “modernizing device” “was used to describe an electrical circuit, which [they] found connotes sufficient structure when coupled with a detailed description of the circuit’s operation.”¹⁰⁸

In *Flo-Healthcare Solutions*, another case overruled by *Williamson*, the court held that “height adjustment mechanism” imparted enough structure such that it did not invoke § 112(f).¹⁰⁹ The court reasoned that “the noun ‘adjustment,’ which modifies ‘mechanism’ here, has a reasonably well-understood meaning as a name for a structure.”¹¹⁰ The court also looked to the intrinsic record:

No evidence intrinsic to the ‘178 patent casts doubt on this conclusion. The term “height adjustment mechanism” appears in the written description of the ‘178 patent twenty-four times, and not once is it used in a purely functional manner designed to invoke § 112, ¶ 6. Instead, the written description typically uses the term “height adjustment mechanism” to designate a class of structures that are generally understood to persons of skill in the art.¹¹¹

Here, the court is not clear on whether the patentee is acting as his own lexicographer with respect to the term “height adjustment mechanism” or whether the intrinsic evidence may be used to establish a class of structures with which the specification is implicating through its disclosed embodiments of the term.

The court in *Flo Healthcare Solutions* appears to be meshing two concepts into one, a patentee’s volition to be his own lexicographer and a

F.3d 1090 (Fed. Cir. 2008) (holding the limitation “mechanism for moving said finger” as invoking means-plus-function).

107. *Inventio AG v. ThyssenKrupp Elevator Americas Corp.*, 649 F.3d 1350, 1359 (Fed. Cir. 2011), *overruled by* *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339 (Fed. Cir. 2015) (en banc).

108. *Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015), *cert. denied sub nom. Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 136 S. Ct. 1173 (2016) (citing *Inventio*, 649 F.3d at 1358).

109. *Flo Healthcare Sols., L.L.C. v. Kappos*, 697 F.3d 1367, 1375 (Fed. Cir. 2012), *overruled by Williamson*, 792 F.3d 1339.

110. *Id.* at 1374 (citing RANDOM HOUSE UNABRIDGED DICTIONARY 25 (2d ed. 1993) (defining “adjustment” as: “3. a device, as a knob or lever, for adjusting: *the adjustments on a television set*”)).

111. *Id.* at 1374.

term's "ordinary meaning in the art." In any event, the court seems to imply that, because the specification contains embodiments of the term "height adjustment mechanism" which have associated structure, the term, as construed in the claims, "indicates a structure, and is not simply a nonce word or a verbal construct that is used as a substitute for the term 'means for.'"¹¹² The court infers structure based on the fact that the specification contains embodiments of the term that connote structure. Under the new standard of § 112(f) invocation under *Williamson*, one wonders whether such terms would still avoid the ambit of § 112(f).

In *Robert Bosch*,¹¹³ the court held that the terms "program recognition device" and "program loading device" did not connote enough structure such that they escaped the ambit of § 112(f).¹¹⁴ The court noted that the term "device" has been cited to be a "nonce" term and that the specification did not "provide [any] structural guidance."¹¹⁵ Specifically, the court found that the specification is "silent" about how the "devices" receive and process signals.¹¹⁶ The court distinguished *Inventio* by saying that in *Inventio* "the specification and drawings of the patent-in-suit not only described in detail how the 'modernizing device' was 'connected to an elevator control and a computing unit' but also showed the internal components of the 'modernizing device,' including a processor, a signal generator, a converter, memory, and signal receiver elements."¹¹⁷ The *Bosch* court also looked to the specification for "structural guidance" in construing the terms at issue.¹¹⁸ The court concluded that no such guidance was found in the specification and, thus, § 112(f) is invoked.¹¹⁹ Then, to no surprise, the court found that the claim was indefinite for failing to disclose sufficient structures or materials under § 112(b).¹²⁰

However, this creates further confusion as it implies that the court may read structural limitations into the claim element from the specification in determining whether § 112(f) is invoked. One might wonder how this claim construction of limiting the claim element to structures in the specification as disclosed differs from a construction in

112. *Id.* at 1374-75 (citations omitted).

113. *Robert Bosch, L.L.C. v. Snap-On Inc.*, 769 F.3d 1094 (Fed. Cir. 2014).

114. *Id.* at 1101.

115. *Id.* at 1100.

116. *Id.*

117. *Id.* (citing *Inventio AG v. ThyssenKrupp Elevator Americas Corp.*, 649 F.3d 1350, 1358 (Fed. Cir. 2011), *overruled by Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339 (Fed. Cir. 2015) (en banc)).

118. *Id.* ("Much like the descriptions of the 'program recognition device,' the passages in the specification on which *Bosch* relies to discuss the 'program loading device' provide no structural guidance.").

119. *Robert Bosch, L.L.C.*, 769 F.3d at 1101.

120. *Id.*

which § 112(f) was invoked, which would, in turn, limit the claim element to those structures as well.

Another case where the patentee was attempting to analogize their functional language to that of *Inventio* was *Media Rights Techs., Inc.*¹²¹ The patentee argued that the term “compliance mechanism” should be found to not invoke § 112(f) because the specification “describes how the ‘compliance mechanism’ is connected to and interacts with the other components of the system,” among other things.¹²² The court acknowledged that disclosure relating to how the functional element is “connected to other claimed components of the system” is a relevant inquiry, but that in *Inventio* there was more, namely that the specification disclosed “how the ‘modernizing device’ and its internal components operated as a circuit.”¹²³ There was no analogous disclosure in the patentee’s patent with respect to the “compliance mechanism.”¹²⁴

In *Advanced Ground Information Systems, Inc. v. Life360, Inc.*, the Federal Circuit relied on *Williamson* in holding that a term composed of constituent words that are known in the art does not require a finding that § 112(f) does not apply.¹²⁵

Many of the determinations discussed above turn on whether the claim term, as a whole, includes adjectival terms that limit the scope of the claim element to certain structures or materials. As discussed above with respect to *Bosch*, the courts may look to the specification to interpret “coined” terms to determine whether the term recites sufficient structure such that § 112(f) is not invoked. Thus, many determinations of indefiniteness hinge on whether the specification contains specific structure, regardless of whether § 112(f) is actually invoked.

B. *Scope and Limits of Disclosing Corresponding Structure*

Once means-plus-function treatment is invoked for a functional term, the “structure, material, or acts” corresponding to the functional term must be determined by looking to the specification.¹²⁶ If the specification does not disclose adequate “structure, material, or acts” for all the functions that are attributed to the term, then the whole claim fails for indefiniteness

121. *Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366 (Fed. Cir. 2015), *cert. denied sub nom. Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 136 S. Ct. 1173 (2016).

122. *Id.* at 1372.

123. *Id.* at 1373. The court also acknowledged that *Inventio* was decided under a heightened standard with respect to the invocation of § 112(f). *Id.*

124. *Id.*

125. *Advanced Ground Info. Sys., Inc. v. Life360, Inc.*, 830 F.3d 1341, 1343 (Fed. Cir. 2016).

126. 35 U.S.C. § 112(f) (2012).

pursuant to 35 U.S.C. § 112(b).¹²⁷ “In order to qualify as corresponding, the structure must not only perform the claimed function[(s)], but the specification must clearly associate the structure with performance of the function.”¹²⁸ To determine whether there is *sufficient* corresponding “structure, material, or acts” “disclosed in the specification” such that the claim is definite, “one skilled in the art [must be able to] understand what structure (or material or acts) will perform the recited function[(s)].”¹²⁹ Courts take a two-step approach in determining the scope of means- and step- plus-function terms.¹³⁰ The two steps are (1) to determine the function(s); and (2) to thereafter determine the corresponding structure that performs those function(s).¹³¹ In performing the second step, the courts determine whether the claim is definite under § 112(b).¹³²

In the first step, the claim limitation is analyzed to determine the function(s) that it is recited to perform.¹³³ A claim may recite a means-plus-function limitation as performing multiple functions and, naturally, if there is no corresponding structure for any one of the functions, then the claim is indefinite for failing to have a sufficiently definite scope for that means-plus-function limitation.¹³⁴ Understanding how the courts will read a claim in light of other evidence to identify corresponding structure is becoming increasingly important, especially with respect to the wavering standard of invocation of § 112(f).

“Generally, a number of factors may be considered when determining the scope of a means-plus-function limitation, ‘including the language of the claim, the patent specification, the prosecution history of the patent, other claims in the patent, and expert testimony.’”¹³⁵ In light of all these factors, the structure must not only correspond to the means-plus-function

127. *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1354 (Fed. Cir. 2015) (en banc).

128. HARMON, *supra* note 22, at 425.

129. MPEP § 2181 (9th ed. Rev. 7, Nov. 2015). *See Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1381 (Fed. Cir. 1999).

130. 5A DONALD S. CHISUM, CHISUM ON PATENTS § 18.03[5][d], 18-544.306 (2015).

131. *Id.* at § 18.03[5][d], 18-544.308 (“It is error to search first for the corresponding structure and then, based on that structure, determine the function.”) (citing *Omega Eng’g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1330 (Fed. Cir. 2003)). *See also* HARMON, *supra* note 22, at 425 (“[F]unction must be determined before corresponding structure can be identified.” (internal citations omitted)).

132. 5A CHISUM, *supra* note 130, § 18.03[5][d], at 18-544.308.

133. *Id.*

134. *See Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1354 (Fed. Cir. 2015) (en banc) (holding the claim that recited the term “distributed learning control module” to be indefinite because the term invoked means-plus-function treatment while not providing any corresponding structure for one of the three functions it was claimed to perform).

135. *In re Hayes Microcomputer Prods., Inc. Patent Litig.*, 982 F.2d 1527, 1543 (Fed. Cir. 1992) (citing *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 975 (Fed. Cir. 1985)).

term, but it must also be adequate for performing those functions recited in the claims.¹³⁶

Determining what structures *correspond* to the claim limitation can be a daunting task. The corresponding structure is ascertained in the light of the different intrinsic and extrinsic factors listed above and from the view of a person with ordinary skill in the relevant art.¹³⁷ It should be appreciated that, for purposes of determining corresponding structure with respect to a § 112(f) invocation, the correct standard is different than that of the standard used for assessing the sufficiency of the disclosure for enablement.¹³⁸ Here, “[t]he inquiry is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing that structure.”¹³⁹

While in certain contexts understanding what constitutes an adequate corresponding structure may be readily apparent, in other contexts it may be difficult. Namely, in claims that involve a function to be performed by a computer, this task may be quite difficult. This may be due to the fact that the construction of a general-purpose computer is widely understood, as is its programming to carry out any particular task, and so the patent drafter then naturally assumes that merely disclosing a computer and the desired function is sufficient to support the claimed means. However, reciting a computer generally as the corresponding structure to perform the function of the means-plus-function limitation has been rejected in the courts numerous times as insufficient.¹⁴⁰ Patentees commonly include limitations that recite a general “nonce” term and then provide the meaningful limitations in qualifying clauses that ubiquitously begin with a phrase that is synonymous with “programmed to,” such as “configured to.” One example of such a limitation would be “a control unit configured to determine one or more vehicle properties based on received data from a remote location.” According to *Williamson*, the Federal Circuit would probably argue, upon encountering this limitation in the right context, that “unit” is a “nonce” term; that “control” provides no structure; and, therefore, the specification must be assessed to determine the corresponding structure.

136. *Williamson*, 792 F.3d at 1351-52 (explaining that when § 112(f) is invoked, the “specification must disclose adequate corresponding structure to perform all of the claimed functions.”).

137. Harmon, *supra* note 22, at 425 (“This perspective is undertaken from the perspective of a [person having ordinary skill in the art].”).

138. Biomedino, L.L.C. v. Waters Techs. Corp., 490 F.3d 946, 953 (Fed. Cir. 2007). See also MPEP § 2181 (9th ed. Rev. 7, Nov. 2015).

139. *Biomedino*, 490 F.3d at 953.

140. See *WMS Gaming, Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1348 (Fed. Cir. 1999); *Aristocrat Techs. Austl. PTY Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

Although what constitutes adequate corresponding structure can be seen as a seemingly subjective and nebulous inquiry in nearly all means- or step- plus function cases, the inquiry is even more dubiously regarded when it comes to computer-related functional limitations. Generally, when the recited function is to be carried out by a computer, the courts view the requirement of corresponding structure to be limited, not to a general-purpose computer, but to a special-purpose computer wherein the special-purpose computer is a general-purpose computer that is configured to carry out a specific algorithm that performs the recited function.¹⁴¹

The reason for holding that a general-purpose computer is not sufficient for corresponding structure relates back to a keystone principle of functional claiming in that the patent should not preempt all uses of performing a function through purely functional claiming.¹⁴² While a general-purpose computer may not theoretically preempt every possible implementation of a function, in all actualities, claiming a general-purpose computer does preempt nearly all reasonable and useful implementations of that function.¹⁴³ In *Aristocrat*, the Federal Circuit recognized this issue:

Because general purpose computers can be programmed to perform very different tasks in very different ways, simply disclosing a computer as the structure designated to perform a particular function does not limit the scope of the claim to “the corresponding structure, material, or acts” that perform the function, as required by section 112 paragraph 6.¹⁴⁴

By this general-purpose versus special-purpose computer distinction, the courts seem to be saying that a general computer does not provide *enough* structure for purposes of definiteness when certain special programming is needed—i.e. programming that requires more than “basic functions of a microprocessor.”¹⁴⁵

In *Noah Sys.*, a Federal Circuit case involving a “special purpose computer,” the court distinguished between two types of cases: “First, cases in which the specification discloses no algorithm; and second, cases in which the specification does disclose an algorithm but a defendant

141. *WMS Gaming, Inc.*, 184 F.3d at 1348 (“A general purpose computer, or microprocessor, programmed to carry out an algorithm creates ‘a new machine, because a general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software.’”).

142. *See id.*

143. *See Aristocrat Techs. Austl. PTY Ltd*, 521 F.3d at 1333 (“For a patentee to claim a means for performing a particular function and then to disclose only a general purpose computer as the structure designed to perform that function amounts to pure functional claiming.”).

144. *Id.* at 1333.

145. *See infra* note 152 and accompanying text.

contends that disclosure is inadequate.”¹⁴⁶ The court went on to state that if there is no algorithm disclosed, then there cannot be sufficient structure regardless of any extrinsic evidence on the matter provided by someone having ordinary skill in the art.¹⁴⁷

Nonetheless, the Federal Circuit has held that not all limitations reciting a function relating to a computer needs to disclose an algorithm for performing the recited function. In *Katz*, the Federal Circuit held that for “functions [that] can be achieved by any general purpose computer without special programming,” no special-purpose computer (i.e. a general-purpose computer programmed with an algorithm) needs to be disclosed. This exception, coined “the *Katz* exception,” referred to general computer functions, such as the functions of “‘processing,’ ‘receiving,’ and ‘storing.’”¹⁴⁸ The Federal Circuit, however, has only analyzed this exception twice.¹⁴⁹

In *EON*, the Federal Circuit stuck with the general-/special- purpose computer distinction,¹⁵⁰ but clarified the *Katz* exception, stating that “‘special programming’ includes any functionality that is not ‘coextensive’ with a microprocessor or general purpose computer.”¹⁵¹ In doing so, it also overruled the district court’s holding “that ‘special programming’ does not encompass commercially available off-the-shelf software.”¹⁵² It should also be appreciated that *EON* affirmed *Katz* in light of *Nautilus*, which, as described above, strengthened the definiteness requirements under § 112(b).¹⁵³ Additionally, in *EON*, the court reaffirmed that “a person of ordinary skill in the art plays no role whatsoever in determining whether an

146. *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1313 (Fed. Cir. 2012).

147. *Id.* This is entirely consistent with the principle that when structure is wholly absent from the specification, one skilled in the art may not testify in a way that imparts structure into the specification and thereby to the functional limitation. *See id.* at 1312; *Omega Eng’g, Inc., v. Raytek Corp.*, 334 F.3d 1314, 1332 (Fed. Cir. 2003); *Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005).

148. *In re Katz Interactive Call Processing Patent Litigation*, 639 F.3d 1303, 1316 (Fed. Cir. 2011).

149. *See EON Corp. IP Holdings L.L.C. v. AT & T Mobility L.L.C.*, 785 F.3d 616 (Fed. Cir. 2015); *See Ergo Licensing, L.L.C. v. CareFusion 303, Inc.*, 673 F.3d 1361, 1371 (Fed. Cir. 2012).

150. *EON Corp. IP Holdings L.L.C.*, 785 F.3d at 621. *See* Dennis Crouch, *Eon v. AT&T and the role of “Pure Functional Claiming”*, PATENTLY-O (May 8, 2015), <http://patentlyo.com/patent/2015/05/pure-functional-claiming.html> (“[T]he actual facts are that the disclosed microprocessor and does provide some amount of structure. As with abstract-idea analysis [under § 101], it seems here that the question is not so black-and-white, but rather whether some magical threshold has been crossed.”).

151. *EON Corp. IP Holdings L.L.C.*, 785 F.3d at 623.

152. *Id.* (“A microprocessor or general purpose computer lends sufficient structure only to *basic functions of a microprocessor*. All other computer-implemented functions require disclosure of an algorithm.” (emphasis added)).

153. *Id.*

algorithm must be disclosed as structure for a functional claim element,”¹⁵⁴—i.e. whether the *Katz* exception applies.

With these principles in mind regarding “corresponding structure,” a review of a few recent cases will facilitate one’s understanding of how courts, specifically the Federal Circuit, have applied these principles thereby providing an insight into how they *may* apply the same in the future. In *Ergo*, the court held that the limitation “control means” invoked means-plus-function treatment and that the corresponding language in the specification used “control device” synonymously with this limitation.¹⁵⁵ However, the court stated that “control device” provides no more structure than “control means” and that the only other corresponding structure in the specification was that the “control device” contained memory.¹⁵⁶ The court said that the memory is “not capable to perform the function of ‘controlling the adjusting means.’”¹⁵⁷ Judge Newman dissented, stating, in essence, that here, and in many other cases, patents may be invalidated “on purely formalistic grounds,” and not because the patent fails to define the scope.¹⁵⁸

In *Noah Sys.*, the claim limitation at issue was:

means for providing access to said file of said financial accounting computer for said first entity and/or agents of said first entity so that said first entity and/or said agent can perform one or more activities selected from the group consisting of entering, deleting, reviewing, adjusting and processing said data inputs.¹⁵⁹

The court found that the “access means” really performed two functions: “(1) providing access to the file; and (2) once access is provided, enabling the performance of delineated operations.”¹⁶⁰ Therefore, the court said, “[a]ny algorithm must . . . address both aspects of this functional language.”¹⁶¹ The court found that there was an algorithm provided for the first function because the specification disclosed “that authorized agents are provided with passcodes and that agents cannot enter, delete, review, adjust or process data inputs within the master ledger unless the passcode is verified.”¹⁶² However, the court held that there was no algorithm disclosed for the second function and, thus, the claim is indefinite.¹⁶³ The court

154. *Id.*

155. *Ergo Licensing, L.L.C. v. CareFusion 303, Inc.*, 673 F.3d 1361, 1364-65 (Fed. Cir. 2012).

156. *Id.* at 1364.

157. *Id.*

158. *Id.* at 1372 (Newman, J., dissenting).

159. *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1307 (Fed. Cir. 2012).

160. *Id.* at 1314.

161. *Id.*

162. *Id.*

163. *Id.* at 1317.

views the specification as only recognizing that the computer needs to be programmed in a way to enable the second function to be carried out.¹⁶⁴

In a case from September 2016, *Cox Commc'ns, Inc. v. Sprint Commc'n Co. LP*, the Federal Circuit held that “processing system,” a term that both parties agreed did not invoke § 112(f), was sufficiently definite.¹⁶⁵ The claims at issue “specify that the claimed functions are achieved through the use of the ‘processing system,’ which the parties agree is, as used in the context of the patents here, a general purpose computer.”¹⁶⁶ The court reasoned that “here, functional language promotes definiteness because it helps bound the scope of the claims by specifying the operations that the ‘processing system’ must undertake.”¹⁶⁷ Moreover, the court upheld the validity of the claims under the heightened definiteness standard in *Nautilus*: “In sum, ‘processing system’ does not render the claims indefinite because it does not prevent the claims, read in light of the specification and the prosecution history, from informing those skilled in the art about the scope of the invention with reasonable certainty.”¹⁶⁸

V. CONSEQUENCES OF § 112(F) INVOCATION

As noted above, unintentional invocation of § 112(f) can be detrimental to an applicant in that the applicant’s proposed patent may be construed more narrowly than intended, or even rendered invalid. As implicated, a claim drafter that recites potentially functional limitations in a claim must either anticipate mean-plus-function or step-plus-function constructions of their claims or take a gamble on invoking § 112(f). In the latter case, the chances of invocation are especially strong in apparatus claims and may be reduced through specifying sufficient structure in the claim itself; however, this may force the applicant to limit their claim to a much narrower scope. Patent drafters must therefore balance the breadth of the claim with the likelihood of invalidity. Stated differently, while a claim limitation may be drafted in such a way that may invoke § 112(f), the specification must, therefore, include sufficient “structure, material, or acts” to perform the functions recited in the claim limitation. The risk of invalidation of the patent claim as a whole due to the insufficient description of the “structure, material, or acts” as defined in the specification and the risk of overly narrowing the claim must be balanced

164. *Id.* at 1316 (Although the specification discloses that this function could be performed by off-the-shelf software, the court held that this, again, was merely functional and did not amount to an algorithm for carrying out the function.).

165. *Cox Commc'ns, Inc. v. Sprint Commc'n Co. LP*, 838 F.3d 1224, 1233 (Fed. Cir. 2016).

166. *Id.* at 1232 n.4.

167. *Id.* at 1232.

168. *Id.* at 1233.

by the drafter. This becomes more difficult where the law is constantly in flux.

The decreased strength of the presumption against invocation seems to contradict the principle that “a patentee is free to be his own lexicographer.”¹⁶⁹ This suddenly weakened presumption results in more unintentional invocation of § 112(f) and, therefore, the disclosure in the specification may restrict the scope of the patent to an ill-considered construction, thus frustrating the ability of a patentee to be his own lexicographer. This problem is due not so much to the lowering of the bar of the presumption, but to the fact that the lowering of the bar was not anticipated. From the Federal Circuit cases over the last decade, one would notice a trend of gradually increasing strength of the presumption against invocation of § 112(f) without using the statutory term “means.”¹⁷⁰ Then, in one fell swoop, the Federal Circuit dismantled any strength attributed to this presumption thereby leaving already submitted applications and granted patents in a state of uncertainty as to the scope, if not validity, of claims with functional language.¹⁷¹

This sudden dismantlement of strength of the presumption has very real and consequential effects. As noted above, invocation of § 112(f) has the effect of limiting elements of a claim. Means-plus-function treatment of a claim limitation, wherein the corresponding structure and its equivalents are read into the limitation, may render the patent granted to be considerably narrower from that which was intended to be claimed. This is especially true in the case of an unanticipated invocation of § 112(f).

The chance of unintentional invocation may be mitigated before and during prosecution of the application in question; however, the PTO may not necessarily determine that a claim limitation invokes § 112(f) even though the Federal Circuit later may determine that it does.¹⁷² Furthermore,

169. 5A CHISUM, *supra* note 130, § 18.03[2][c], at 18-414. *See also* MPEP § 2173.01 (9th ed. Rev. 7, Nov. 2015) (“A fundamental principle contained in 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph is that applicants are their own lexicographers. They can define in the claims what they regard as their invention essentially in whatever terms they choose so long as any special meaning assigned to a term is clearly set forth in the specification.”).

170. *See supra* pp. 8-9.

171. *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1358 (Fed. Cir. 2015) (en banc) (Newman, J., dissenting) (“The court now overrules dozens of cases referring to a ‘strong presumption’ of means-plus-function usage, and goes to the opposite extreme, holding that this court will create such usage from ‘[g]eneric terms such as “mechanism,” “element,” “device,” and other nonce words.”) (citing *Williamson*, 792 F.3d at 1350).

172. MPEP § 2111 (9th ed. Rev. 7, Nov. 2015) (“the Office does not interpret claims in the same manner as the courts.”); *see In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22 (Fed. Cir. 1989). However, given that the MPEP instructs examiners to give the claim its “broadest reasonable interpretation,” the PTO would more likely to apply § 112(f) treatment to a claim element than the courts. If, for example, the PTO examined a claim under the law prior to *Williamson* when the presumption was quite

as illustrated above, the Federal Circuit may set new standards with respect to § 112(f) and this may cause an unintentional invocation of § 112(f). In any event, it is desirable to take precautions to eliminate, or at least mitigate, the possibility of an unintentional invocation of § 112(f). As previously indicated, many validity problems may now occur, not because the patentee did not follow the guidance provided by the Federal Circuit and Supreme Court as to how a claim will be construed, but because the courts have effectively redefined how they will construe the claims. While the courts continually face new challenges due to the new technology that has arisen, and while they work to develop proper rules on how to construe claims for purposes of definiteness, they are nonetheless leaving practitioners and patentees in a state of uncertainty as to the scope and validity of their claims.¹⁷³ Although it is necessary for the law to change with the times, it may be of greater importance that the law ensures, at least to a reasonable extent, that a patentee receive the protection he or she understood was worked out with the Patent Office when the patent was procured.¹⁷⁴

VI. DRAFTING ROBUST CLAIMS IN LIGHT OF RECENT CASE LAW REGARDING MEANS-PLUS-FUNCTION

Although the law pertaining to functional claiming recently seems to be in a fluctuating state, there are still some safeguards that can be taken to mitigate potential undesirable effects from the ever-changing scope of § 112.¹⁷⁵

First, a patentee may seek to avoid § 112(f) altogether. Use of structural terms may suppress the chances of undesirable invocation of §

strong, the examiner may forgo, rightfully so, means-plus-function invocation. Then, upon a challenge to the claim after *Williamson*, the claim may be invalidated through invocation of means-plus-function treatment and failure to attribute sufficient structure to the limitation.

173. Moreover, is this even the judicial prerogative? See *Williamson*, 792 F.3d at 1358 (Newman, J., dissenting) (“When the statute is clear, judicial interpretation is unnecessary.”).

174. *Bilski v. Kappos*, 561 U.S. 593, 613 (2010) (Stevens, J., concurring) (“In the area of patents, it is especially important that the law remain stable and clear.”); see also *Williamson*, 792 F.3d at 1359 (Newman, J., dissenting) (“There is indeed a need for judicial consistency concerning the construction of means-plus-function claims.”); *Williamson*, 792 F.3d at 1363 (Newman, J., dissenting) (“The problem with today’s ruling is that the court has rejected the rigor and simplicity of paragraph 6 and the patentee’s intent, replacing it with arbitrary judicial subjectivity.”).

175. See Corey M. Beaubien & Scott A. Hogan, *Making Sense of Non(ce)sense—Seeking Broad Claim Coverage and Avoiding Unwanted Means-Plus-Function Treatment*, 90 PATENT TRADEMARK & COPYRIGHT J. 1869 (BNA 2015).

112(f).¹⁷⁶ As illustrated above, using a term that connotes some structure, as opposed to or in addition to a “nonce” term, may remove the claim limitation out of the ambit of § 112(f).¹⁷⁷ For example, if the element to be disclosed is a device that senses light, reciting a “sensor,” as opposed to a “sensing device,” may avoid § 112(f) invocation, while still providing sufficiently broad coverage, because the term “sensor” may be recognizable as a term of art that connotes structure.¹⁷⁸

Understanding terms of art is very important while drafting claims and, as discussed above, may be very important when attempting to avoid § 112(f) treatment of a claim limitation. There may be a broad term that covers a wide ranging class of objects that satisfies what is to be captured by the claim limitation. Also, if multiple structural elements are to be captured by the claim, instead of using a “nonce” term in a functional way, the drafter can use multiple terms known to those skilled in the art in a disjunctive manner that captures those specific structures capable of performing the function, such as through use of a Markush group.

In addition to attempting to ensure desired interpretation of claims while still gaining broad coverage, it may prove useful to have diversified independent claims that, for example, use terms for analogous elements that range in broadness (e.g., less functional and more structural based to more functional and less structural based).

Also, to this point, since the validity of the patent may depend on the level of abstraction of structure that is attributed to the claimed term, a tiered approach for disclosing structure in the specification may be one of the more prevalent approaches. This is especially true since, in the court’s construction of the claim and search for sufficient corresponding structure, the courts seem to hold valid claims that have specific-enough structure and, in doing so, construe the claim to be limited to those structures the court deems sufficient. By using a tiered approach ranging in the level of specificity of the structures disclosed, a patentee, at least by the current interpretations presented by the courts, may achieve optimal patent coverage with respect to the scope of these potentially means-plus-function invoking terms.

For example, a patentee may explicitly include a wide-range of definitions with multiple examples of “structure, material, or acts” which range from broad classes to specific implementations. Broad coverage may be sought through attributing numerous broad classes of “structure,

176. See Michael D. Stein, *How Structural Claim Limitations Can Save Software Patents*, LAW360 (Feb. 9, 2016 11:09 AM), <http://www.law360.com/articles/751757/how-structural-claim-limitations-can-save-software-patents>.

177. See Beaubien & Hogan, *supra* note 175, at 1871 (“Use nonce words wittingly and only when coupled with a term or phrase connoting structure to a skilled artisan”).

178. *Id.* (“Recite terms in claims with known meanings in the particular technology area and that connote structure to skilled artisans.”).

material, or acts” to the corresponding term.¹⁷⁹ Upon claim construction, a patentee may point to various levels of abstraction in their specification, starting with the broadest, in an attempt to find the point at which the term is definite while maximizing its scope. For example: “a computer,” “a computer that includes a processing device,” “a computer that includes a microprocessor configured to read computer instructions from a non-transitory memory device and operate according thereto,” “a computer that includes a microprocessor configured to read machine code that has been compiled into computer-readable operations from a non-transitory memory device and operate according to the computer-readable operations and wherein the computer-readable operations include native computer functionality.”¹⁸⁰ Such varying levels of detailed structure may be recited in dependent claims.¹⁸¹

The previous examples described how a patentee may obtain desirable claims while avoiding indefiniteness and patentability issues. While seeking broad claim coverage is typically desirable, it may not be worth the risk of invalidity due to § 112. Moreover, an applicant may rather ensure a patent is issued for a narrower embodiment of their invention than risking invalidity altogether. This decision may be guided based on the client’s objectives for patent protection on the invention. If the client desires the broadest possible coverage, then the drafter may seek to obtain this using a diverse set of claims (e.g., different levels of broadness, different elements). If the client is trying to preempt competitors from copying their commercial embodiment, then the drafter may instead direct the claims more specifically to the particular device or system used by the client.¹⁸²

179. *Id.* (“[A]void reliance on extrinsic evidence to support a claim. Instead, provide a definition in the specification to make it part of the intrinsic record.”). *See also id.* (“Couple functional claim elements with structures and/or components that are invariably present in the claimed apparatus.”).

180. *See* Stein, *supra* note 176 (“The inter-relationship between the executable software instructions and the hardware processor is structural in the sense that it greatly constrains any particular system implementation. In other words, the instructions per se are simply a series of symbols or numeric values. They do not intrinsically convey any information. It is the processor, which by design was preconfigured to interpret the symbols/numeric values, which imparts meaning to the instructions.”). For a discussion regarding potential approaches on how to provide sufficient structure to computer-related claims, *see id.*

181. Beaubien & Hogan, *supra* note 175, at 1871 (“Use dependent claims to add structure to an otherwise functional claim element in the accompanying independent claim. If a court invokes means-for treatment to the functional claim element, the patentee might be able to rely on the dependent claim for a more desired outcome.”).

182. *Id.*

CONCLUSION

Patentees commonly use functional limitations to broadly claim their invention. Seeking to avoid the narrowing effects of § 112(f),¹⁸³ patentees have been creative in their drafting techniques. But, the variety of technologies and drafting approaches confronting the courts have led to stricter patentability requirements, including stricter definiteness requirements under § 112(b) and § 112(f). This includes interpreting function-performing “nonce” terms as the equivalent of “means” which thereby invoke means-plus-function treatment under § 112(f). As discussed above, expanding § 112(f) application to such “nonce” terms adds vagueness and ambiguity to claim construction, and the invocation question becomes one involving a certain level of subjectivity.¹⁸⁴ Given the uncertainty under § 112(f), a patentee should, therefore, look to case law analogous to his or her claims and technology to understand and identify the functional claiming and related indefiniteness issues that might arise.

JAMES D. STEVENS JR.*

183. See Schepers, *supra* note 3.

184. There always has been a level of subjectivity, it was just that the strong presumption of § 112(f) invocation—i.e., the strength of this presumption leading up to *Williamson*—resulted in a smaller number of cases being treated under § 112(f) thereby subjecting a smaller number of patents to the necessarily subjective approach that must be taken in such contexts. See *Williamson v. Citrix Online, L.L.C.*, 792 F.3d 1339, 1363 (Fed. Cir. 2015) (en banc) (Newman, J., dissenting).

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