PATENT CLUTTER

Janet Freilich[*]

Patent claims are supposed to be precise, succinct, and to isolate the invention from descriptive and contextual material so that readers can more easily identify and understand the invention. To this end, claims must be only one sentence long and must distinctly point out the invention. Unfortunately, claims are widely decried as incomprehensible, vague, and practically impossible to search. This Article argues that these problems arise in part because claims are full of "clutter", language that is not about the invention. The Article assesses the claim language in 25,000 patents and shows that approximately 25% of all claim language relates to something other than the invention. This non-inventive language appears across industries and is associated with a host of problems. In particular, it may exacerbate three of the biggest problems in patent law: the searchability, examinability, and comprehensibility of patents.

This Article is the first to propose and document the problem of cluttered claims. Drawing on the empirical results, the Article offers several reforms, in particular, using the prolix, lack of enablement, and lack of written description rejections to dispose of the worst offenders, and using better algorithms and different litigation rules to adapt to the remaining uses of non-inventive language. The study also generates important theoretical insights for scholars. Claims are often assumed to be entirely synonymous with the invention and all elements of the claim are thought to relate equally strongly to the invention. As this Article demonstrates that the assumption is patently not correct, it concludes that we must reform our thinking about the relationship between claims and the invention and offers a framework for doing so.

---

[*] Associate Professor, Fordham Law School. I thank Yonathan Arbel, Oren Bar-Gill, Colleen Chien, Nestor Davidson, Jesse Frumkin, John Goldberg, John Golden, Jennifer Gordon, Clare Huntington, Joseph Kupferman, Ethan Leib, Josh Lerner, Oskar Liivak, Alan Marco, Michael Meurer, Kristen Osenga, Mark Patterson, Sarah Pihonak, Nicholson Price, Duane Rudolph, Rachel Sachs, Joshua Sarnoff, Steven Shavell, Holger Spamann, Henry Smith, Haris Tabakovic, Tess Wilkinson-Ryan, Tom Wollmann, Steven Worthington, and Dennis Yao. This Article has also greatly benefited from feedback from patent examiners and members of the Office of the Chief Economist at the United States Patent and Trademark Office, and from participants at the New England Junior Scholars Workshop, PatCon 6, the 8th Annual Junior Scholars in Intellectual Property Workshop, and the 2016 Intellectual Property Scholars Conference.

TABLE OF CONTENTS

INTRODUCTION

Perhaps the most famous catchphrase in patent law is "the name of the game is the claims."[1] Claims are the portion of the patent document that sets out the invention.[2] Claims are intended to be concise (by law, only one sentence) and to isolate the invention from surrounding contextual information so that readers can easily spot the invention.[3] The remainder of the patent, the specification, is a longer narrative description that provides other information such as background and instructions on how to make and use the invention. For example, a patent on the "beerbrella"[4] claims the invention: a "combined beverage container and shading apparatus"; while the specification describes the previously-known techniques of making novelty beverage accessories, miniature umbrellas, and of keeping beer cold.[5] Congress mandated claims in 1836 in order to focus attention on the invention so that the public, examiners, and courts could readily understand what had been patented. In a sense, claims are roughly akin to black-box warnings on medical products,[6] summaries in SEC filings,[7] and warning boxes in contracts.[8] These structures all give readers a quick way to grasp the key information in the document.

In practice, however, "[i]t isn't working."[9] Claims are so "notoriously difficult to understand"[10] that their meaning "is hotly debated in virtually every patent case."[11] Claims are criticized as vague, unreadable, excessively long, impossible to search, and dreadful to interpret.[12] These concerns are

---

[1] Apple Inc. v. Motorola, Inc., 757 F.3d 1286, 1298 (Fed. Cir. 2014) (quoting Giles Sutherland Rich).

[2] 35 U.S.C. § 112.

[3] MANUAL OF PATENT EXAMINING PROCEDURE § 608.01(m) (2015) [hereinafter "MPEP"].

[4] An attachable umbrella shaped thusly:  . U.S. Patent No. 6,637,447, Fig. 1. (issued Oct. 28, 2003).

[5] *Id*. at claim 1; col. 1, ll.10-53.

[6] Cite

[7] Ryan Bubb, *TMI? Why the Optimal Architecture of Disclosure Remains TBD*, 113 MICH. L. REV. 1021 (2015).

[8] Ian Ayres & Alan Schwartz, *The No-Reading Problem in Consumer Contract Law*, 66 STAN. L. REV. 545 (2014).

[9] Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PENN. L. REV. 1743, 1744 (2009).

[10] Kristen Osenga, *The Shape of Things to Come: What We Can Learn from Patent Claim Length*, 28 SANTA CLARA COMPUTER & HIGH TECH. L.J. 617, 620 (2012).

[11] Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 Tex. L. Rev. 1991, 2003 (2006).

[12] JAMES BESSEN & MICHAEL MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK (2008).

longstanding. For example, in 1916, Judge Learned Hand expressively remarked that claims can be "such a waste of abstract verbiage…It takes the scholastic ingenuity of a St. Thomas with the patience of a yogi to decipher their meaning."[13] Claim dysfunctionality has generated a copious literature[14] and policy proposals and changes at the highest level.[15] Yet the problems with claims remain acute. In recent years, the White House,[16] Federal Trade Commission,[17] Patent and Trademark Office,[18] and Supreme Court[19] have all begun seeking improvements to the clarity and quality of patent claims.

This Article, an empirical analysis of 25,000 patents, argues that a major problem with claims is that they are cluttered with vast amounts language that have little to do with the invention. Claims are supposed to be brief, one-sentence descriptions of the invention. But they often are not. Instead, claims can swell into pages-long (but still one sentence) descriptions of both the invention and a considerable number of other topics. This prolixity and opaqueness taxes the ability of judges, examiners, competitors, and the public to read and understand patent claims. Because no one has documented the cluttered state of patent claims, clutter has not been acknowledged as a contributor to the array of problems associated with claims and, perhaps consequently, many policy solutions thus far have not been effective.

In this study, I measure claim language that is "non-inventive" (about something other than the invention). Non-inventive language is identified by looking or terms that appear in the claims but never or rarely in the specification.[20] Surprisingly, although claims are supposed to be exclusively about the invention, approximately 25% of language in patent claims is not about the patent's core invention. The practice of including non-inventive language in patent claims is roughly analogous to "keyword stuffing" (a

---

[13] Victor Talking Mach. Co. v. Thomas A. Edison, 229 F. 999, 1001 (2d Cir. 1916).

[14] Section I.C., *infra*.

[15] *Id*.

[16] The White House, *Fact Sheet: White House Task Force on High-Tech Patent Issues* (June 4, 2013), https://www.whitehouse.gov/the-press-office/2013/06/04/fact-sheet-white-house-task-force-high-tech-patent-issues.

[17] THE EVOLVING IP MARKETPLACE: THE OPERATION OF IP MARKETS: HEARING BEFORE THE FED TRADE COMM'N 16 (Mar. 18, 2009) [hereinafter EVOLVING IP MARKETPLACE].

[18] United States Patent and Trademark Office, *Glossary Initiative*, http://www.uspto.gov/patent/initiatives/glossary-initiative#heading-2.

[19] Nautilus, 134 S. Ct. at 2134.

[20] This proxy is explained further in Section II, *infra*. If a term in the claims is not in the specification, it suggests either that the element is sufficiently well known that it needs no description, and thus that it is not new, or that the inventor is unable to discuss it because they have not yet reduced it to practice and thus, according to patent law, not yet invented it. 35 U.S.C. § 112.

technique of optimizing a website's Google ranking by packing the website with popular but irrelevant keywords to draw in searchers).[21] Alternatively, this non-inventive language may be indicative of instances of overpromising, where the patentee had ideas for possible uses for and additions to the core invention, but the patent contains no evidence that the additions exist or work.[22] Both possibilities obscure the invention actually protected by the patent and misguide the reader.

For example, U.S. Patent No. 6,450,942 describes a machine that can create electrical pulses according to particular rhythms and can be used to stimulate the human vascular system.[23] The patent then proceeds to claim use of this machine in many different contexts, such as "for cosmic medicine, including for the preservation of muscle tone of astronauts."[24] Although this sounds quite exciting, there is no detail in the patent about "cosmic medicine" or astronauts, treatment of astronauts is far afield from the core invention of the patent, and nobody (including the patentee) knows how to preserve muscle tone in astronauts.[25] Quite simply, "cosmic medicine" should not be in the patent claim because the patentee has not invented cosmic medicine.

Because non-inventive language is prevalent, patentees presumably perceive some benefit to its presence. Discussions with patent attorneys reveal that patentees may choose to include non-inventive language for signaling purposes such as increasing the audience for their patent or advertising the functionality of their invention,[26] or for decoy purposes such as obscuring the invention in a flurry of non-inventive language.[27] Alternatively, patentees may include non-inventive language in order to "wear out" the patent examiner[28] or as a hedge against uncertain future prosecution and litigation by creating

---

[21] Google disapproves of this practice. *See* Google, *Irrelevant Keywords*, *available at* https://support.google.com/webmasters/answer/66358?hl=en ("'Keyword stuffing' refers to the practice of loading a webpage with keywords or numbers in an attempt to manipulate a site's ranking in Google search results. Often these keywords appear in a list or group, or out of context (not as natural prose). Filing pages with keywords or numbers results in a negative user experience, and can harm your site's ranking. Focus on creating useful, information-rich content that uses keywords appropriately and in context.").

[22] This type of language in patent claims would render the patent invalid for lack of enablement and/or failure to provide sufficient written description. 35 U.S.C. § 112.

[23] U.S. Patent No. 6,450,942, claim 1 (issued Sept. 17, 2002).

[24] *Id*. at claim 6.

[25] NASA is currently working on the question. *See, e.g.*, NASA, *Effect of Prolonged Space Flight on Human Skeletal Muscle*, http://www.nasa.gov/mission_pages/station/research/experiments/245.html.

[26] *See infra* notes 243-250 and accompanying text.

[27] *See infra* notes 251-252 and accompanying text.

[28] *See infra* notes 302-305 and accompanying text.

options for interpretation or narrower backup claims.[29]

However, the ubiquity of non-inventive language may help explain the pervasive inability of claims to achieve their goal of clearly defining the invention. Non-inventive language clutters the claims and increases transaction costs involved in using claims. For example, companies often search for patents before launching a product.[30] Searchers generally conduct keyword searches of patent claims, and often have to sift through thousands of results to find less than a dozen relevant patents.[31] Adding non-inventive elements to a patent claim therefore multiplies the number of times a patent will appear – irrelevantly – in searches. Relatedly, if a cursory search reveals the appearance of a crowded technological field, it may dissuade future research in the area.[32] In addition, comprehending patent claims is so difficult that it is often impossible to determine the boundaries of a patent claim without a decision from a court.[33] Because claims must be restricted to one sentence, elongating that sentence by adding non-inventive language impedes the comprehensibility of a phrase that was likely close to unintelligible to the lay reader to begin with. [34] Further, patent examiners are charged with reviewing "every limitation"[35] of a claim, so a claim with extensive non-inventive elements greatly increases examination time and burden. Finally, it is far from clear that these claims are even valid. The Patent Act requires patentees to disclose the claimed invention in detail, to satisfy the "enablement" and "written description" requirements.[36] Copious non-inventive language suggests that a claim does not meet these disclosure hurdles.

Drawing on the empirical findings of this paper, I offer suggestions for reform that may alleviate some of these problems. First, examiners could cut down on clutter by making better use of the already-available prolix rejection, and using algorithms comparable to the ones developed for this study to flag enablement and written description problems.[37] Makers of patent search software could additionally use the results of this study to improve search

---

[29] *See infra* notes 253-258 and accompanying text.

[30] *See, e.g.*, THE EVOLVING IP MARKETPLACE, *supra* note 17, at 16.

[31] *Id*.

[32] *See, e.g.*, G.W.A. Milne, *Very Broad Markush Claims: A Solution or a Problem? Proceedings of a Round-Table Discussion Held on August 29, 1990*, 1991 J. CHEM. INFO. & COMP. SCI., 9, 29 (1991).

[33] Burk & Lemley, *supra* note 9, at 1744.

[34] Osenga, *supra* note 10, at 620 ("One factor that affects comprehension of language is the word length of the passage to be understood.").

[35] MPEP § 2103.

[36] 35 U.S.C. § 112(a).

[37] Section IV.C.1., *infra*.

capabilities.[38] Moreover, small tweaks to PTO regulations could require patent applicants to define all claim terms (cutting down on clutter and confusion) and encourage applicants to move excess language from the claims to the specification.[39]

In addition to documenting the problem and offering a roadmap for reform, this study also generates important theoretical insights relevant to patent scholarship. It is a "bedrock principle" that the patent claim and the invention are the same thing, and that "focusing on the invention is nothing more than a short-hand reference for the claim[s]…"[40] Relatedly, the Supreme Court has unambiguously stated that claims have no "heart" or "gist," but are instead completely co-extensive with the invention[41] – yet scholars have argued that this is unlikely to be true, and the Court too appears to be backing away from the statement.[42] In both debates, there is no empirical evidence one way or the other. This Article presents considerable evidence that claims are neither synonymous nor coextensive with the invention. As a consequence, we must recognize that the correspondence between claim and invention is far more complex than previously thought. Further, although the ideal for patent claims is to concisely isolate the invention, this ideal may simply not reflect the realities of claim drafting and the ways in which people read and understand words. This Article recommends rethinking the assumption of "synonymy of invention and claim" and instead using a framework that balances precision, concision, and accuracy as a way to understand the ideal shape of patent claims.

The Article proceeds as follows. Part I provides background on the theory and goals underlying patent claims and surveys literature on practical problems and policy efforts relating to claims as well as scholarly debates about the relationship between claim and invention. Part II describes the methodology used to identify non-inventive language in patent claims and Part III presents the results. Part IV.A explores how non-inventive language may contribute to practical problems in patent law. IV.B analyzes theoretical implications, particularly the need to rethink the assumption of synonymy of claim and invention and to reevaluate whether it is actually possible to completely separate the invention from its context. IV.C then suggests policy approaches intended to preserve the integrity of patent claims as concise and accurate phrase succinctly outlining the relevant invention.

---

[38] Section IV.C.2.a., *infra*.

[39] Section IV.C.2.b., *infra*.

[40] *Id*. at 2 (criticizing the 'cult' and arguing that the invention is distinct from the claims).

[41] Aro Manufacturing Co. v. Convertible Top Replacement Co., 365 U.S. 336, 455-45 (1961)

[42] *See infra* notes 143-155 and accompanying text.

I. PATENT CLAIMS

A. The Theory of Claims

1. Origin and History

The patent system is fundamentally about incentivizing innovation.[43] This is reflected in the Constitutional mandate to "promote the Progress of Science and useful Arts" by giving inventors "the exclusive Right to their…Discoveries."[44] Patents give their owners a monopoly over the patented subject matter, which is thought to incentivize the creation of inventions that would not otherwise be profitable.[45]

However, innovation does not end with a first invention; innovation is an iterative process whereby an initial invention is developed and enhanced by others.[46] Thus, patent law must account for both upstream innovators and downstream innovators.[47] These innovators have different needs.[48] First, a patent that is very broad benefits upstream innovation by providing a strong initial incentive, but may harm downstream innovation by blocking those secondary developments.[49] Second, it is crucial that the boundaries of the patent monopoly are clearly delineated so that downstream innovators can be on notice of the boundaries and either avoid them, work around them, or seek a license from the patentee.[50] Without proper notice, development near a patented area is fraught with risk and uncertainty and may consequentially be unnecessarily chilled.[51] Thus, the "notice function" of patents is of fundamental importance when crafting patent doctrine.[52]

The US patent system has experimented with several different mechanisms to accomplish these dual goals of scope calibration and delineation. The first

---

[43] E.g., Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1576, 1577 (2003). *See also* Stephanie Plamondon Bair, *The Psychology of Patent Protection*, 48 CONN. L. REV. 297, 302-12 (2016) (exploring different rationales for patent law).

[44] Art. I, § 8, cl. 8.

[45] Dmitry Karshtedt, *The Completeness Requirement in Patent Law*, 56 B.C. L. REV. 949, 951 (2015).

[46] *Id*. at 840.

[47] Merges & Nelson, *supra* note **Error! Bookmark not defined.**, at 916.

[48] *Id*.

[49] *Id*.

[50] JAMES BESSEN & MICHAEL MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK, 235-36 (2008).

[51] Athletic Alternatives, Inc. v. Prince Mfg., Inc., 73 F.3d 1573, 1581 (Fed. Cir. 1996).

[52] Halliburton Energy Services, Inc. v. MI LLC, 514 F.3d 1244, 1249 (Fed. Cir. 2008).

Patent Act of 1790 required inventors to write a "description…of the thing or things by him or them invented or discovered."[53] This might include "an entire machine, although most parts of it may have been long known and used" and the patent would only cover the improvement to the machine discovered by the patentee.[54] From the "full explanation of the invention" readers would "extract its principle."[55] Thus, readers of patents – including patent examiners, courts, and competitors – had to perform two analyses. First, they had to determine what had already been invented in order to understand the scope of the patentee's contribution and then they had to determine what similar, but not identical, devices would be close enough to infringe on the patent.[56]

This proved difficult because the differences between the inventions and the prior art were often vaguely described and the question of what similar devices or processes would infringe was not specified at all.[57] Further, inventions were often improvements on already created processes, and patents would describe the improved machine as a whole without specifying the particular improvement.[58] It was common to find courts holding that "the patent is fatally defective. As the matter stands, the nature of the improvement is altogether unintelligible."[59] A frustrated Chief Justice Marshall asked, "How is any man to inform himself of what is patented, so that he may avoid the danger of infringement?"[60] An equally frustrated Justice Story complained that

> if the description in the patent mixes up the old and the new and does not distinctly ascertain for which in particular the patent is claimed…it is impossible for the court to say what in particular is covered as a new invention.[61]

The problem was not one of accuracy, but rather one of overinclusiveness and lack of specificity. Readers sought to draw out the inventive core of the

---

[53] Patent Act of 1790, ch.7, § 2, 1 Stat. 109.

[54] Thomas P. Jones, *Information to Persons Applying for Patents, or Transacting Other Business at the Patent Office*, 6 FRANKLIN J. & AM. MECHANICS' MAG. 332, 334 (1828).

[55] Karl B. Lutz, *Evolution of the Claims of U.S. Patents*, 134, 135 (1938).

[56] *Id*.

[57] ROBERT MERGES, PETER MENELL, MARK LEMLEY, INTELLECTUAL PROPERTY IN A NEW TECHNOLOGY AGE III-189 (2016) ("Justice Joseph Story, who would emerge as the leading patent jurist…immediately came to see the problems with vague and conclusory descriptions of inventions.").

[58] Whittemore v. Cutter, 29 F. Cas. 1123, 1124 (C.C.D. Mass. 1813). *See also*, Norris Boothe, *Exercising a Duty of Clarity*, 30 BERKELEY TECH. L.J. 445, 448 (2015).

[59] Isaacs v. Cooper, 13 F.Cas. 153, 154 (C.C.D.Pa. 1821)

[60] Evans v. Eaton, 20 U.S. 356, 391 (1822).

[61] Lowell v. Lewis, 15 F.Cas. 1018, 1018 (C.C.D.Mass. 1817).

patent, but were unable to identify this core amidst a deluge of other information. Justice Story explained that a patent on a new method of making a saddle

> contains the whole truth relative to the discovery: but the objection is throughout the whole of a very intelligible description of the mode of making the saddle, the patentee has not distinguished what was new from what was old…nor pointed out in what particulars his improvement consisted.

Commentators fretted that the system created "endless difficulties for the courts and public" who could not ascertain what was covered by a patent and also "great and irreparable loss to inventors and patentees" who ultimately did not receive the protection warranted for their invention.[62]

2. Claims

To resolve the challenge of finding the invention amidst a longer description of contextual details and prior discoveries, the Patent Act of 1836 implemented a new requirement: claims.[63] The purpose of claims was to prevent situations where the boundaries of the invention were obscured by a longer text.[64] Instead of combining the new and the old in one long document, patents now contained a separate section, the claims, to isolate and highlight the new. Inventors had to "particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery."[65] Claims point precisely to the inventive matter, and only to the inventive matter. Claims serve to both allow the inventor to delineate the monopoly she invented and to put competitors on notice of the boundaries of the patent.[66] Claims remain, and serve the same function, in modern patents.[67]

After the passage of the statutory requirement for claims, patents consisted of two primary sections: the specification[68] and the claims.[69] The specification

---

[62] N.J. Brumbaugh, *History and Purpose of Claims in United States Patent Law*, 14 J. PAT. OFF. SOC'Y 273, 281 (1932).

[63] RISDALE ELLIS, PATENT CLAIMS § 3 (1949). Strictly speaking, claims were not new. Patent applicants had been using claims for years before the statutory amendment as a method of clarifying their application. *Id*.

[64] Lutz, *supra* note 55, at 135.

[65] Patent Act of 1836 § 6, 5 Stat. 117.

[66] Lisa Larrimore Ouellette, *Pierson, Peer Review, and Patent Law*, 69 VAND. L. REV. (forthcoming) (2016).

[67] 35 U.S.C. § 112.

[68] The term "specification" is sometimes used to describe the entire patent – both the narrative portion and the claims. Here it is used to describe only the narrative portion of the

is a detailed narrative description of the invention, how it is made and used, preferred embodiments, any experiments or testing performed, and some background on the field of the invention.[70] The specification contains all context for the invention and may run over twenty or thirty pages.[71] The claims appear at the end of the specification and are a summation of the patent right claimed by the patentee.[72] Claims "particularly point[] out and distinctly claim[] the subject matter which the applicant regards as his invention or discovery."[73] Claims are limited to one sentence each and define the boundaries of the patent monopoly.[74] The dual claim-specification structure creates two sections with different emphases. Claims value precision and parsimony and deliberately exclude contextual material. Details and context remain important, but are placed in the specification where they are separate from the claim.[75] The specification should "ideally serve as a glossary to the claim terms."[76]

Thus, a claim in a patent directed to the invention of a paperclip might read:

"I claim a paperclip."

This claim limits the patent grant to paperclips alone and excludes, for example, staples or binder clips. Claims are often written in language more complex than the paperclip claim above, for example a claim might describe a piece of bread in a sandwich as "a first bread layer having a first perimeter surface coplanar to a contact surface."[77]

Patents may contain multiple claims as long as no two claims cover

---

patent and excludes the claims.

[69] 37 C.F.R. § 1.51. Patents may also contain drawings. *Id*.

[70] 37 C.F.R. § 1.71. *See also* Jeanne Fromer, *Patent Disclosure*, 94 IOWA L. REV. 540, 545 (2009).

[71] *E.g.*, Dennis Crouch, *Patent Specifications Continue to Rise in Size*, PATENTLY-O (April 23, 2012) (finding that in 2010, patent specifications averaged almost 50,000 characters. This is around 30 pages).

[72] MPEP § 2173.

[73] 37 C.F.R. § 1.75(a).

[74] MPEP § 608.01(m).

[75] MPEP § 2173.03 ("…claim terms must find clear support or antecedent basis in the specification so that the meaning of the terms may be ascertainable by reference to the specification…No claim may be read apart from and independent of the supporting disclosure on which it is based.").

[76] *Id*.

[77] COLLEN CHIEN, THOMAS COTTER, & RICHARD POSNER, REDESIGNING PATENT LAW 2 (forthcoming) (citing U.S. Patent No. 6,004,596 (issued Dec. 21, 1999)).

precisely the same material[78] and the claims are directed to the same general invention.[79] Thus, one patent may contain claims directed to different aspects of an invention, claims that describe the invention at different levels of generality, or claims directed to different embodiments of an invention.[80] A patent directed to the invention of a paperclip might have the following claims:

I claim:

1. A paperclip.
2. A paperclip made of metal.
3. A method of making a paperclip comprising folding a metal wire into a spiral.

The Patent Act provides an organizational format for applications with multiple claims. By statute, claims are divided into two types: independent claims and dependent claims.[81] Independent claims stand alone and do not reference any other claims. Dependent claims must refer back to another claim.[82] This is illustrated by the example below:

I claim:

1. A paperclip.
2. The paperclip of Claim 1 wherein the paperclip is made of metal.
3. The paperclip of Claim 2 wherein the paperclip is folded into the shape of a spiral.

Dependent claims must be narrower than the independent claims to which they refer.[83] Thus, patents contain multiple claims of successively narrower scope

[78] 37 C.F.R. § 1.75(b).

[79] 35 U.S.C. § 121 ("If two or more independent and distinct inventions are claimed in one application, the Director may require the application to be restricted to one of the inventions.").

[80] GENERAL PRINCIPLES OF CLAIM DRAFTING § 112 ("Rarely can an invention be fully covered by a single claim. There are, except in the simplest cases, a number of related features which require separate claims for maximum protection. Good practice requires claims directed to all of these features instead of only one, so as to render it as difficult as possible to avoid infringement…").

[81] 35 U.S.C. § 112(d).

[82] *Id.* ("a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.").

[83] 37 C.F.R. § 1.75(c).

and multiple claims that cover slightly different areas.[84] There is no mandate to use dependent claims but they are encouraged by the PTO's fee structure.[85]

B. The Practice and Policy of Claims

Claims were implemented in order to distinctly point out the invention and avoid the prior problem of sorting through a long description to find the inventive kernel. Claims are supposed to allow third parties to discern and understand the boundaries of the invention.[86] However, even early in the history of patent claims, commentators noted that while properly drafted claims could improve the notice function of patents, excessively verbose or multiplied claims could impede notice.[87] Judge Learned Hand complained that

> In such a waste of abstract verbiage it is quite impossible to find any guide. It takes the scholastic ingenuity of a St. Thomas with the patience of a yogi to decipher their meaning, as they stand.[88]

In the present day, there remain concerns that patent claims fail to fulfill their purpose of clearly and "distinctly"[89] pointing out the boundaries of the invention, and instead muddy boundaries and preclude proper notice. This Article argues that claims are often not distinctly pointing out the invention because the claims are cluttered with non-inventive language. Although non-inventive language has not been previously documented in the literature, there are many reports of problems that – when armed with knowledge of non-inventive language – appear be due at least in part to the prevalence of non-

---

[84] This is a longstanding practice. *See, e.g.*, In Parke-Davis & Co. v. Mulford Co., 189 F. 95 (1911) ("There is nothing improper, so far as I can see, in first putting your claims as broadly as in good faith you can, and then, ex abundanti cautela, following them successively with narrower claims designed to protect you…").

[85] As part of the basic filing fee, the PTO allows applicants to file 3 independent and 17 dependent claims. 37 C.F.R. § 1.16. Applicants can file additional claims, but the Office levies additional per claim fees. *Id*.

[86] *See, e.g.*, Markman v. Westview Instruments, 52 F. 3d 967, 997 (1995) ("a patent may be thought of as a form of deed which sets out metes and bounds of the property the inventor owns for the term and puts the world on notice to avoid trespass…"). *See also* Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co., 520 U.S. 17, 30 (1997) (discussing the "the role of claims in defining an invention and providing public notice.").

[87] William R. Pratt, *Multiplicity of Claims*, in PATENT OFFICE PAPERS: 1914-1917, Vol. 7, 13 (Pat. Off. Soc'y 1914) ("By multiplying words [patent attorneys] hope to hit the mark, on the same principle that the user of a shot gun hopes to hit a solitary bird. But the principles which apply to shot guns do not apply to rhetoric. The true rhetorician uses a rifle, not a blunderbuss. With him every word hits its target, because it is adapted to do so, and because he knows how to aim it").

[88] Victor Talking Mach., 229 F.Cas. at 1101.

[89] 35 U.S.C. § 112.

inventive language. The discussion below explores what is currently known about these problems. Section IV, *infra*, argues that non-inventive language contributes to the problems.

1. Disclosure

Because claims are a bare-bones way of conveying information, a reader seeking detail about the invention must turn to the specification. The specification is therefore required to provide enough information about the material in the claims to show that the applicant possessed the claimed invention and to teach someone knowledgeable in the field of the invention[90] how to make and use the claimed invention.[91]

Policymakers are quite concerned that applicants are routinely including claim language that is not supported by the specification.[92] In May 2016 the PTO announced a case study to determine if continuation applications claim subject matter that is not sufficiently described, and whether examiners are appropriately enforcing the written description requirement.[93] The PTO has additionally run several new training programs for examiners on the topics of claim clarity, enablement, and written description.[94] Despite efforts for reform, there is little information on how or why patentees are using claim language in ways incompatible with these requirement. Essentially, the problem is one of mismatch between the material described in the claims and invention as it is set out in the specification. It may be that this mismatch arises because some portion of the claim language does not actually relate to the invention.

---

[90] Formally known as a "person having ordinary skill in the art." This is a hypothetical person familiar with all relevant information in a technical field. Standard Oil Co. v. Am. Cyanamid Co., 774 F.2d 448, 454 (Fed. Cir. 1985). The person having ordinary skill in the art is sometimes analogized to tort law's "reasonable person." E.g., Panduit Corp. v. Dennison Mfg. Co., F.2d 810 F.2d 1561, 1566 (Fed. Cir. 1987).

[91] This is called the "enablement" requirement. 35 U.S.C. § 112. The related written description doctrine requires the specification to contain enough information to demonstrate to a person of ordinary skill in the art that the inventor possessed the claimed invention. Moba, B.V. v. Diamond Automation, Inc., 325 F.3d 1306, 1319 (Fed. Cir. 2003). *See also* In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

[92] As are courts and scholars. *See* John R. Allison & Lisa Larrimore Ouellette, *How Courts Adjudicate Patent Definiteness and Disclosure*, 65 DUKE L.J. 609, 610-12 (2014).

[93] *Id*.

[94] United States Patent Office, *USPTO-led Executive Actions on High Tech Patent Issues*, http://www.uspto.gov/patent/initiatives/uspto-led-executive-actions-high-tech-patent-issues [hereinafter 'Actions on High Tech Patent Issues'].

2. Clarity

Patent claims are supposed to provide clearly delineated boundaries on the patent monopoly, so that competitors are on notice about the actions that they are barred from taking without permission of the patentee.[95] However, claims often "lack clarity" or are "vague" and "otherwise difficult to interpret."[96] Compounding the challenge of reading and understanding patent claims, patentees may choose (sometimes deliberately, sometimes unavoidably) to use terms that are imprecise.[97]

In response to these concerns, the White House called for patents "with clearly defined boundaries to provide adequate notice to help others avoid costly and needless litigation down the road."[98] The PTO recently completed a "Glossary Pilot Program" for software-related applications that encouraged patent applicants to include glossaries in the specification "to define terms used in the patent application."[99] A recent Government Accountability Office report on patent quality criticized the PTO because it does "not specifically require patent applicants to clearly define the terms used in their applications…"[100] This problem arises in part because terms in the claims are not defined in the specification. As described in more detail in Section III, *infra*, non-inventive language is often not defined in the specification. It may therefore contribute to this problem.

3. Searchability

An additional way in which claims can fail to provide notice of their

---

[95] *E.g.*, Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 US 722, 732 (2002) ("If competitors cannot be certain about a patent's extent, they may be deterred from engaging in legitimate manufactures outside its limits, or they may invest by mistake in competing products that the patent secures. In addition, the uncertainty may lead to wasteful litigation between competitors…").

[96] EVOLVING IP MARKETPLACE, *supra* note 17, at 81.

[97] Nautilus, 134 S. Ct. at 2134.

[98] Actions on High Tech Patent Issues, *supra* note 94.

[99] United States Patent and Trademark Office, *USPTO Launches New Glossary Program to Promote Patent Claim Clarity* (March 26, 2014), http://www.uspto.gov/about-us/news-updates/uspto-launches-new-glossary-pilot-program-promote-patent-claim-clarity. The Pilot ran from 2014 to 2016 and the PTO has not yet fully analyzed the results, but a survey indicated that a majority of examiners believed that a glossary requirement would improve patent quality and claim clarity. GOVERNMENT ACCOUNTABILITY OFFICE, GAO-16-490: PATENT OFFICE SHOULD DEFINE QUALITY, REASSESS INCENTIVES, AND IMPROVE CLARITY, 33-34 (Jul. 20, 2016), *available at* http://www.gao.gov/assets/680/678113.pdf.

[100] The report went on to warn that "Without making use of tools to improve the clarity of patent applications…the agency is at risk of issuing unclear patents that may not comply with statutory requirements." *Id*. at 35.

boundaries arises in the context of patent searches. Before launching a product, it is good practice to search for patents that might potentially be infringed.[101] Patents are often sought through keyword searches of patent claims[102] but, in areas where the number of patents is high and patent language is abstract and non-standardized (software in particular), search costs can be extremely high and searches almost impossible.[103] A substantial portion of the cost of clearance searches is caused by false positive results swept in by keyword searches that must then be manually removed by a patent attorney or other searcher.[104] This is because, unlike a Google search, where a searcher can stop as soon as relevant results are found,[105] patent searchers cannot stop looking until all results have been reviewed,[106] because failing to find a relevant patent can result in hundreds of millions of dollars in damages.[107]

The complexity of this process means that clearance searches are difficult, expensive, and sometimes ineffective.[108] An FTC report describing the challenges of sifting through a large number of patents recommends that the

---

[101] EVOLVING IP MARKETPLACE, *supra* note 17**Error! Bookmark not defined.**, at 3.

[102] B.P. Nagori and Vipin Mathur, *Basics of Writing Patent Non-Infringement and Freedom-to-Operate Opinions*, 14 J. INTELL. PROP. RIGHTS 7, 8-9 (2009).

[103] Christina Mulligan & Timothy B. Lee, *Scaling the Patent System*, 68 N.Y.U. ANN. SURV. AM. L. 289, 317 (2012) ("…patent clearance is practically impossible. In software, for example, patent clearance would require the services of many more patent attorneys than exist in the United States."); THE EVOLVING IP MARKETPLACE, *supra* note 17**Error! Bookmark not defined.**, at 16 ("Identifying and reviewing the patents and applications that might conceivably apply to a new product often present daunting challenges in IT industries."). In the pharmaceutical area, where searches are routinely performed, these searches can cost from four figures to six figures. Bessen & Meurer, *supra* note 50, at 55.

[104] For example, a 2003 survey of industry respondents found that "there may be a large number of patents to consider initially – sometimes in the hundreds, and that this number is surely larger than in the past" but that, even in a complicated case, the number of relevant patents was about six to twelve. John P. Walsh et al., *Effects of Research Tool Patents and Licensing on Biomedical Innovation, in* PATENTS IN THE KNOWLEDGE-BASED ECONOMY 285, 286 (Wesley M. Cohen & Stephen A. Merrill eds., 2003). This number is larger in the software industry. Bessen & Meurer, *supra* note 50, at 213 ("Checking thousands of patents is clearly infeasible for almost any software product.").

[105] Google searchers rarely go past the first page of results. Todd Jensen, *2nd Page Rankings: You're the #1 Loser*, GRAVITATE ONLINE (Apr. 12, 2011) *available at* http://www.gravitateonline.com/google-search/2nd-place-1st-place-loser-seriously (finding that 94% of people do not click on a second page result).

[106] Kristine H. Atkinson, *Toward a More Rational Patent Search Paradigm*, in PROCEEDINGS OF THE 1ST ACM WORKSHOP ON PATENT INFORMATION RETRIEVAL 38 (2008) ("Any searcher knows that the first thing to do when you get a thousand hits is to tighten the strategy—but…a more stringent strategy necessarily poses the risk that keywords that captured a patent may get trumped by excluding a word that is innocuous in context…").

[107] *See, e.g.*, NPT, Inc. v. Research in Motion, Ltd., 392 F.3d 1336 (Fed. Cir. 2004) ($500 million payout).

[108] EVOLVING IP MARKETPLACE, supra note 17, at 79.

PTO convene a "government/industry task force or hold a workshop to explore" ways of clarifying patent language and improving the public's ability to search for patents.[109]

The nature of patent searching means that the drafter's choice of words to include in the claims has a great deal of influence on whether that patent will appear in later searches. Ideally, patent claims would include sufficient descriptive terminology so that competitors could find the patent without including additional less relevant terminology that would ensure the patent popped up as a false positive result in unrelated searches. Because searchers are generally only interested in the invention covered by the claims, non-inventive language may be a significant source of false positives.

4. Continuations

After an application is filed with the PTO, inventors will often continue developing the invention. The inventor may realize that there is a new angle on the technology that he or she wishes to claim as well, but that is not well covered by the previous claims. If the original application is still pending[110] and the new claims are supported by the original specification, the applicant can file a "continuation" application, which contains the same specification as the original but different claims.[111]

The availability of continuations is limited by the enablement and written description doctrines. Because no new matter may be added to the specification when filing a continuation application,[112] new claims must be both enabled and adequately described by the original specification. However, there is widespread suspicion that continuations are available too freely and can be used to "overclaim" because by changing "patent claims over time to cover technologies developed after the original application was filed."[113] Empirical research has shown that continuation applications are more likely to be invalidated, which some scholars suggest is because of this "overclaiming"

---

[109] EVOLVING IP MARKETPLACE, *supra* note 17, at 128-29.

[110] 35 USC 120; 37 CFR 1.53(d).

[111] *Id*. The advantage of this strategy is that the new application keeps the same priority date as the original application, so that when an examiner evaluates whether the claims are novel and nonobvious, she does so with reference only to technologies known before the filing date of the original application. MPEP § 201.07.

[112] If some new matter is added, the new application is called a continuation-in-part. 37 CFR 153(b).

[113] John R. Allison, Mark A. Lemley, & Joshua Walker, *Patent Quality and Settlement Among Repeat Patent Litigants*, 99 GEO. L.J. 678, 707 (2012).

practice.[114] There are widespread fears that continuations allow non-practicing entities ("patent trolls") to file continuations to cover technologies independently by others.[115] Because the enablement and written description requirements are lower in the software industry, the problem of continuations as used by non-practicing entities is thought to be most acute in that industry.[116] Continuations have been criticized by scholars[117] and there have been several (unsuccessful) attempts to limit the practice, both by Congress[118] and by the PTO.[119]

Continuations stretch the connection between the patent's claims and its specification. Policy concerns arise out of suspicions that the connection is often stretched beyond recognition. However, the relationship between the claims and specification of a continuation application is an open empirical question.

5. Examination

The Patent and Trademark Office is under attack for granting poor quality patents.[120] Much of the criticism focuses on the small amount of time allocated to examining each patent – an average of eighteen hours per patent.[121] Part of the strain on patent examiners is the length and clarity of claims. Patent examiners are charged with evaluating every element of a patent claim. The

---

[114] Ronald J. Mann & Marian Underweiser, *A New Look at Patent Quality: Relating Patent Prosecution to Validity* 8, Columbia Law & Econ. Working Paper No. 381 (2010), available at http://ssrn.com/abstract=1671784.

[115] E.g., Mark A. Lemley, *Are Universities Patent Trolls?*, 18 FORDHAM INELL. PROP. MEDIA & ENT. L.J. 611, 630 (2008). Non-practicing entities enforce patents but do not produce products themselves. Clark Asay, *The Informational Value of Patents*, 31 BERKELEY TECH. L.J. 259, 315 (2016).

[116] James Bessen, Jennifer Ford, and Michael J. Meurer, *The Private and Social Cost of Patent Trolls*, 2012 REGULATION 26, 32.

[117] Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. Rev. 63, 76 (2004).

[118] H.R. 2795, 109th Cong. (2005) (granting the USPTO the explicit ability to limit continuations).

[119] Changes to Practice for Continuing Applications, Requests for Continued Examination Price, and Applications Containing Patentably Indistinct Claims, 71 Fed. Reg. 48-01 (Jan. 3, 2006).

[120] Julie E. Cohen, *Reverse Engineering and the Rise of Electronic Vigilantism: Intellectual Property Implications of "Lock-Out" Programs*, 68 S. CAL. L. REV. 1091, 1177-80 (1995); Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 591 (1999).

[121] Mark. A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1, 2 (2001).

Manual of Patent Examining Procedure instructs examiners that, "when evaluating the scope of a claim, *every* limitation in the claim must be considered."[122] It further requires that, in order to make a rejection of a patent, "personnel must articulate…a finding that the prior art included *each element* claimed…"[123] As claims get more numerous,[124] the process of examining the claims surely becomes more time intensive. Further, if claims are complex, long, vague, and difficult to interpret it stands to reason that evaluation time would also increase. Thus, the feasibility of the examination process is tied to the clarity and functionality of claims. If non-inventive language increases both the intricacy and length of claims, it may increase examination time.

* * * * *

In sum there are a wide range of claim issues where policy makers are presently seeking greater understanding of the problem and suggestions for improvement. Given the widespread concerns about the efficacy of claims, a better understanding of both claims and problems with claims is vital. I argue in Section IV, *infra* that non-inventive language contributes to the problems described above.

C. Scholarly Debates

Claims are the heart of the patent. As such, there are a broad set of scholarly debates around the ideal shape and purpose of claims. These are briefly sketched below. As a preliminary matter, there is a widespread and many-faceted debate about claim clarity. Scholars question whether claims are clear; those who believe that claims are not clear ask why and how lack of clarity arises and explore the consequences of the problem, and some question whether clarity is actually a goal that should be pursued by the patent system.[125] By exploring a source of opacity in claims, this project provides

---

[122] MPEP § 2103 (emphasis added).

[123] MPEP § 2143 (emphasis added).

[124] The number of claims per patent is increasing. *See* John A. Allison & Mark A. Lemley, *The Growing Complexity of the US Patent System*; Jean O. Lanjouw & Mark Schankerman, 32 RAND J. Econ. 129, 140 (2001).

[125] *See, e.g.*, JAMES BESSEN & MICHAEL MEURER, PATENT FAILURE 8 (2008); Tun-Jen Chiang, *Forcing Patent Claims*, 113 MICH. L. REV. 513, 523 (2015); Tun-Jen Chiang & Lawrence B. Solum, *The Interpretation-Construction Distinction in Patent Law*, 123 YALE L.J. 530, 532-33 (2013); Christopher Cotropia, *Patent Claim Interpretation Methodologies and Their Claim Scope Paradigms*, 47 WM. & MARY L. REV. 29, 127 (2005); John M. Golden, *Construing Patent Claims According to Their "Interpretive Community"*, 21 HARV. J. L. & TECH. 322, 368 (2008); Jeanne Fromer & Mark Lemley, *The Audience in IP Infringement*, 112 MICH. L. REV. 1251, 1267 (2014); Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1743, 1752-53 (2009); Mark A. Lemley, *The Changing Meaning of Claim*

empirical evidence that will generally impact the debate.

In addition, the results of this study relate to a number of narrower, though no less important, debates. These are explored below. For each debate, scholars have staked out well-developed theoretical positions, but there is a near-complete lack of empirical evidence. The debates generally revolve around the assumption that claims are exclusively about the invention. Because this Article argues that claims include a great deal of language that is *not* about the invention, the results presented in this Article provide evidence that may shape further thinking in these areas.

1. Synonymy of Claim and Invention

Because claims define the boundaries of the patent,[126] patent theory often equates claims with the invention at issue in the patent or uses "claim" and "invention" interchangeably. Christopher Cotropia terms this the "claim-centered" invention view, which regards the "claim itself as the invention for patent law purposes"[127] so that "the claim *is* the invention."[128] Cotropia explains that claim-invention interchangeability has heavily influenced the development of several aspects of patent law.[129]

Oskar Liivak has termed patent theory's equating of patent claims and patented inventions "the cult of the claim."[130] Liivak describes the "bedrock principle" that the patent claim and the invention are the same thing, and that "focusing on the invention is nothing more than a short-hand reference for the claim[s]…"[131] Liivak explains that equating claims and inventions has significant implications for broad areas of patent law such as validity, claim

---

Terms, 104 MICH. L. REV. 101, 110 (2006).

[126] The Supreme Court has long recognized that "a patent's precise claims mark its monopoly boundaries." Graver Mfg. Co. v. Linde Co., 339 US 605, 617 (1950). Patent claims are also commonly analogized to the "metes and bounds" system of determining a property's boundaries. *See, e.g.*, Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co., 598 F.3d 1336, 1347 (Fed. Cir. 2010) ("Claims define the subject matter that, after examination, has been found to meet the statutory requirements for a patent…Their principal function, therefore, is to provide notice of the boundaries of the right to exclude and to define limits…").

[127] Christopher Cotropia, *What is the 'Invention'?*, 53 WM. & MARY L. REV. 1855, 1862 (2012).

[128] *Id*. at 1886.

[129] Including the doctrines of claim construction, written description, and the doctrine of equivalents. *Id*. At 1887, 89, 1910.

[130] Oskar Liivak, *Rescuing the Invention from the Cult of the Claim*, 42 SETON HALL L. REV. 1, 2 (2012).

[131] *Id*. at 2 (criticizing the 'cult' and arguing that the invention is distinct from the claims).

scope, and disclosure.[132] Jeffrey Lefstin has also written about the "synonymy of invention and claim,"[133] as have many other scholars,[134] and the leading patent treatise states that "the claim defines the invention for purposes of both patentability and infringement."[135] However, many scholars, including those named above, argue that this synonymy causes courts to focus on the claims to the exclusion of the invention – suggesting that they do not believe the two to be entirely synonymous.[136] Despite these rumblings of dissent, for purposes of patent theory and doctrine, the claim is the invention and the invention is the claim. Whether this assumption of synonymy is true has not been verified.

2. The Heart of the Claim

Closely related to the theory of synonymy of claim and invention is the "well-settled" principle that claims have no heart. [137] The claim's "heart" (also called "essence", "gist", "point of novelty" and "central concept")[138] refers to the notion that claims have some elements that are more important – and constitute the invention itself – while other elements are less important and less relevant.[139] The Supreme Court, in *Aro Manufacturing Co. v. Convertible Top Replacement Co.*, has unequivocally stated that "there is no legally recognizable or protected 'essential' element, 'gist' or 'heart' of the invention…"[140] Instead, the invention is "only the totality of the elements in the claim."[141] The statement that claims have no heart is often repeated by the

---

[132] *Id*. at 10-12.

[133] Jeffrey A. Lefstin, *The Formal Structure of Patent Law and the Limits of Enablement*, 23 BERKELEY TECH. L.J. 1141, 1145 (2008).

[134] *See, e.g.*, Bernard Chao, *The Infringement Continuum*, 35 CARDOZO L. REV. 1359, 1366 (noting the practice of determining the patented invention by "examining claims" but criticizing the practice on the ground that "there may be a surprising disconnect between the specification and the claims."); Amy Landers, *Patent Claim Apportionment*, 19 GEO. MASON L. REV. 471, 479, 495 (2012) (examining the equivalency and suggesting that it may not be correct "[a]s a practical matter."); Saurabh Vishnubhakat, *Cognitive Economy and the Trespass Fallacy: A Response to Professor Mossoff*, 65 FLORIDA L. REV. 38, 38 (2014) (discussing claims as proxies for the invention).

[135] DONALD CHISUM, CHISUM ON PATENTS § 8.01 (2008).

[136] E.g., Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PENN. L. REV. 1743, 1746 (2009); Tun-Jen Chiang, *Forcing Patent Claims*, 113 MICH. L. REV. 513, 522 (2015); Cotropia, *supra* note 127, at 1897; ROBERT MERGES & JOHN DUFFY, PATENT LAW AND POLICY 769 (2013); Liivak, *supra* note 130, at 40.

[137] Mark D. Janis, *A Tale of the Apocryphal Axe: Repair, Reconstruction, and the Implied License in Intellectual Property Law*, 58 MD. L. REV. 423, 454 (1999).

[138] Bernard Chao, *Breaking Aro's Commandment: Recognizing That Inventions Have Heart*, 20 FORDHAM INTELL. PROP., MEDIA AND ENT. L.J., 1183, 1190 (2010).

[139] *Id*. at 1185.

[140] 365 U.S. 336, 455-45 (1961).

[141] *Id*. at 344.

Federal Circuit and lower courts.[142]

However well-settled the proposition may be, scholars dispute the concept that claims have no heart. Recently, several scholars have argued that claims in fact do have a heart, and that it would be beneficial to account for this in patent analyses.[143] For example, Mark Lemley advocates for use of a point of novelty analysis across many patent doctrines and suggests that "it often makes little or no sense to ignore what is novel about the invention."[144] Lemley and others argue that we have actually been inquiring into the heart of the patent all along in several different patent doctrines, producing an incoherence with the Supreme Court's proclamation.[145]

As this literature notes, it is hard to reconcile the Supreme Court's assertion that claims have no heart with doctrines that appear to require inquiry into the heart of the claim. The doctrine of contributory infringement is an example of this tension. Generally, to be liable for patent infringement, one must infringe each and every element of the claim.[146] However, a party can be liable for *contributory* infringement if he infringes on only some of the elements of the patent claim as long as, in doing so, he contributes to another party's direct infringement.[147] Crucially, the contributory infringer is only liable if the contribution constituted "a *material* part of the invention."[148] It is only coherent to speak of a "material" part of the invention if claims contain both material and non-material parts. Yet the *Aro* doctrine appears to foreclose this

---

[142] E.g., Fuji Photo Film Co., Ltd v. Intern. Trade Com'n, 474 F.3d 1281, 1290 (Fed. Cir. 2007); Allen Engineering v. Bartel, 299 F.3d 1336, 1343 (Fed. Cir. 2002); Cooper Cameron Corp. v. Kvaerner Oilfield Products, 291 F.3d 1317, 1341 (Fed. Cir. 2002); Para-Ordnance Mfg. v. SGS Importers Int'l, Inc., 73 F.3d 1085, 1087 (Fed. Cir. 1995); W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1548 (Fed. Cir. 1983). The Federal Circuit additionally recently expanded *Aro*'s doctrine to design patents. *Egyptian Goddess, Inc. v. Swisa, Inc.*, 543 F.3d 665, 678 (Fed. Cir. 2008).

[143] E.g., Mark A. Lemley, *Point of Novelty*, 105 NW. U.L. REV. 1253, 1275 (2011). *See also*, Chao, *supra* note 138, at 1221; Kevin Emerson Collins, *The Knowledge/Embodiment Dichotomy*, 47 U.C. DAVIS L. REV. 1279, 1301 (2014); Amy L. Landers, *Patent Claim Apportionment, Patentee Injury, and Sequential Invention*, 19 GEO. MASON L. REV. 471, 476-77 (2012).

[144] Lemley, *supra* note 143, at 1260.

[145] *Id*. *See also* Chao, *supra* note 138, at 1215-1225; Kevin Emerson Collins, *Getting into the 'Spirit' of Innovative Things*, 26 BERKELEY TECH. L.J. 1217, 1237 (2011).

[146] Dmitry Karshtedt, *Causal Responsibility and Patent Infringement*, VAND. L. REV. 43 (forthcoming 2017).

[147] 35 U.S.C. 271(c) ("Whoever offers to sell…a component of a patented machine, manufacture, combination or composition…constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent…shall be liable as a contributory infringer.").

[148] *Id*. (emphasis added).

path of reasoning.[149]

The debate about whether claims have a heart has recently taken on a new urgency. Among the most contentious issues in patent law is the question of how to draw boundaries between unpatentable abstract ideas and patentable applications of those ideas.[150] The Supreme Court took four cases over five terms between 2010 and 2014 in an effort to resolve the question.[151] These cases created a test that requires judges to inquire into something that looks very much like the heart of the patent claim.[152] Courts must inquire into whether claims have an "inventive concept" which is "an element or combination of elements" within the claim that goes beyond an abstract idea and claims a patentable invention.[153] Several judges on the Federal Circuit noted that this appears to contradict the previous prohibition on searching for the heart of the claim.[154]

This has created a gap between the Supreme Court's theoretical position in *Aro* and the doctrinal test promulgated in later cases. Scholars have rushed into

---

[149] Chao, *supra* note 138, at 1195. Patent damages provide another example. Damages are often seen as out of proportion with the innovation provided by the inventor. *See, e.g.*, John M. Golden, *Patent Trolls and Patent Remedies*, 85 TEX. L. REV. 2111, 2321 (2006); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2003 (2006); Christopher B. Seaman, *Reconsidering the Georgia-Pacific Standard for Reasonable Royalty Patent Damages*, 2010 BYU L. REV. 1661, 1688-1707 (2010). Congress has considered several bills to ensure that the royalty base for damage calculations is more closely linked to the patent's inventive contribution by requiring that courts consider "the claimed invention's specific contribution over the prior art." Patent Reform Act of 2009, H.R. 1260, 111th Cong. § 5 (2009). Amy Landers has collected other bills with similar language: Patent Reform Act of 2009, S. 515, 111th Cong. § 4(2009); Patent Reform Act of 2007, H.R. 1908, 110th Cong. § 5 (2007); Patent Reform Act of 2007, S. 1145, 110th Cong. § 5 (2007). Landers, *supra* note 143, at 472. However, this essentially asks courts to consider the heart of the claim, which they cannot do.

[150] John M. Golden, Flook *Says One Thing*, Diehr *Says Another: A Need for Housecleaning in the Law of Patentable Subject Matter*, 82 G.W. L. REV. 1765, 1765 (2014) ("Defining the bounds of patentable subject matter has become one of patent law's hottest issues.").

[151] Lisa Larrimore Ouellette, *Non-Patent Innovation Incentives*, 5 UC IRVINE L. REV. 1115, 1117 (2015). These cases are Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014); Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107 (2013), Mayo Collaboartive Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289 (2012); Bilski v. Kappos, 561 U.S. 593 (2010).

[152] *See, e.g.*, Bernard Chao, *Novelty in Software Patents*, 1121 (2013); Bernard Chao, *Moderating* Mayo, 107 NW. U.L. REV. 423, 432-33 (2012).

[153] Alice, 134 S. Ct. at 2355.

[154] E.g., CLS Bank Int'l v. Alice Corp. Pty. Ltd., 717 F.3d 1269, 1315 (Fed. Cir. 2013) (Moore J., dissenting in part) ("Federal Circuit precedent abolished the 'heart of the invention' analysis for patentability."); *Id*. at 1298 (Rader J., dissenting in part) ("A court must consider the asserted claims *as a whole* when assessing eligibility") (emphasis in original).

the breach to criticize the theoretical disjointedness.[155] Yet the present state of the discussion leaves unresolved questions. Do claims in fact have a heart? Though there is much speculation, there is no empirical evidence. If claims do have a heart, should we recognize this in current doctrine? Further, an additional criticism is that the current discussion relies on "only the smallest sliver of in-force patents": litigated patents.[156] We have little sense of how the debate might play out in the 99.8% of patents that are never litigated.[157]

II. STUDY DESIGN

The patent document contains a great deal of important information: background on the field,[158] how the invention is made and used,[159] and the claims, a summation of the invention.[160] Historically, the document "mixe[d] up the old and the new"[161] without the claims to distinctly identify the invention. This system left examiners, courts, and readers unable to easily sort through the information in order to understand the contribution of the invention and the boundaries of the patent. In moving to a regime with one-sentence claims to particularly point out the invention, Congress made a choice about how information should be allocated within a patent to accomplish the goals of the system. This choice indicated that while all information historically included in a patent was important, proper scope and notice could best be accomplished by segregating the inventiveness portion from the remainder, and that parsimony was the ideal. Over the following 200 years, this ideal has driven patent theory and doctrine. Yet it is evident that claims fall far short of accomplishing the goals of proper scope and notice. Why?

This project is a large scale textual analysis of the claims of 25,000 patents. This analysis seeks to determine whether the goal of patent claims, separation

---

[155] E.g., *Chao supra* note 152, at 1220-21; Christopher Holman, *Patent Eligibility Post*-Myriad: *Reinvigorated Judicial Wildcard of Uncertain* Effect, 82 G.W. L. REV. 1796, 1806 (2014); Jeffrey Lefstin, *The Three Faces of Prometheus: A Post*-Alice *Jurisprudence of Abstractions*, 16 N.C.J. L. & TECH. 647, 692 (2015); Mark A. Lemley, Michael Risch, Ted Sichelman, and R. Polk Wagner, *Life After* Bilski ,63 STAN. L. REV. 1315, 1335 (2011). The Federal Circuit has also noted that certain ways of incorporating the 'inventive concept' into the court's analysis are "inconsistent with the 1952 Patent Act, and years of Supreme Court, CCPA, and Federal Circuit precedent that abolished the 'heart of the invention' analysis for patentability." *CLS Bank*, 717 F.3d at 1315 (Moore J., dissenting in part).

[156] Lee Petherbridge, *On Addressing Patent Quality*, 158 U. PENN. L. REV. 13, 21 (2009).

[157] Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U.L. REV. 1495, 1501 (2001) ("less than two-tenths of one percent of all issued patents actually go to court.").

[158] MPEP § 608.

[159] 35 U.S.C. § 112.

[160] *Id.*

[161] Lowell v. Lewis, 15 F.Cas. 1018, 1018 (1817).

of the old and the new, was actually accomplished. Specifically, the study asks whether claim language is exclusively about the invention. Analysis of this issue allows exploration of many questions. Do patent claims in fact describe only the invention? Or do they include information that by design should be relegated to the specification? How exactly do patent claims correspond to the invention? "Synonymy" (assumed by patent theory),[162] or something else? If the transition from the old model of a holistic description of the invention to the new model of precise claims was never fully accomplished, it may explain many of the failures of modern-day claims.

A. Methodology

This Article uses the terminology "inventive" to refer to claim language that describes the patented invention and "non-inventive" to refer to all other claim language. "Non-inventive" may refer to concepts that are simply not part of a new product or process, and thus not invented by the patentee, or to concepts that may have been newly conceived by the patentee, but are not anything that the patentee actually appears to have made or to be capable of making (in patent parlance, these claims would be said to be lacking proper "written description" and/or not "enabled").[163]

In order to undertake a large-scale analysis of the inventiveness of claim language, I sought characteristics of claim language that could be categorized by a computer program. The key proxy for whether claim language is inventive is the number of times the language appears in the specification of a patent. This proxy is explained below.

As discussed in more detail in Section I, *supra*, patents consist of two primary sections: the specification[164] and the claims.[165] The specification is a detailed narrative description of the invention, how it is made and used, preferred embodiments, any experiments or testing performed, and some background on the field of the invention.[166] It is followed by the claims, which define the boundaries of the patent claim.

All elements of a claim must be "enabled by" and described in the

---

[162] Lefstin, *supra* note 133, at 1145.

[163] 35 U.S.C. § 112.

[164] The term "specification" is sometimes used to describe the entire patent – both the narrative portion and the claims. Here it is used to describe only the narrative portion of the patent and excludes the claims.

[165] 37 C.F.R. § 1.51. Patents may also contain drawings. *Id*.

[166] 37 C.F.R. § 1.71.

specification.[167] This means that discussion of the element in the specification must be sufficient to demonstrate to someone knowledgeable in the field of the invention that the inventor possessed the claimed invention.[168] The specification must also be sufficient to teach the skilled artisan how to make and use the claimed invention without "undue experimentation."[169] The only exception to the requirement that an element of a claim must be described in the specification is for elements that are "well known in the art."[170] For example, a patent on a yeast microorganism wherein a particular gene is inactivated would not have to describe how to deactivate the gene if methods of doing so were well known to those working in the field.[171]

Patentable subject matter is, by definition, not "well known in the art." To be patentable, an invention must be novel and nonobvious.[172] Any invention that is novel and nonobvious cannot be "well known." It must, therefore, be described in some detail in the specification.[173] For example, a patent application on a novel process for weakening tropical storms by releasing super coolants into the storm was rejected for lack of enablement because the specification did not describe the amount of super coolant needed or the optimal timing of the release.[174]

A novel and nonobvious invention may contain elements that are not themselves novel and nonobvious, which can be necessary parts of a patent claim, but these elements all have aspects of novelty and nonobviousness that require them to be described in the specification. For example, a patent may combine two elements that are individually well known in the art in a manner

---

[167] 35 U.S.C. § 112.

[168] Moba, B.V. v. Diamond Automation, Inc., 325 F.3d 1306, 1319 (Fed. Cir. 2003).

[169] In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988). Precisely what level of experimentation is "undue" varies in different circumstances. *Id*. at 737 ("the determination of what constitutes undue experimentation in a given case requires the application of a standard of reasonableness, having due regard for the nature of the invention and the state of the art.").

[170] In re Buchner, 929 F.2d 660, 661 (Fed. Cir. 1991); MPEP § 2164 ("A patent need not teach, and preferably omits, what is well known in the art.").

[171] Butamax Advanced Biofuels LLC v. Gevo, Inc., 746 F.3d 1202, 1214-15 (Fed. Cir. 2014) (reversing the district court's holding of invalidity due to lack of enablement; finding a question of material fact as to whether methods of deactivating the pathway of the gene were known by those of ordinary skill in the art.).

[172] 35 U.S.C §§ 102-103.

[173] *E.g.*, Automotive Technologies International v. BMW of North American, 501 F.3d 1274, 1283 (Fed. Cir. 2007) ("Although the knowledge of one skilled in the art is indeed relevant, the novel aspect of an invention must be enabled in the patent."); Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997) (explaining that "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement.

[174] In re Hoffman, 558 Fed. Appx. 985, 986 (Fed. Cir. 2014).

that is novel and nonobvious. However, the combination is not well known in the art, and would have to be described in detail in the specification. Claim elements that are not themselves novel or nonobvious might also be added to satisfy other requirements of patentability, for example, to narrow a claim to ensure that the claim is useful, or that it is enabled by the specification. In each of these cases, there would likely need to be a discussion of that element in the specification because it interacts in vital ways with the novel and nonobvious elements of the claim.

For example, U.S. Patent No. 6,505,572 claims "[i]n combination, a water vessel and a chair…"[175] (note that all examples in this Article are drawn from the studied sample of patents). The claim further requires that the chair be positioned at the back of the vessel such that it creates a larger wake behind the vessel.[176] The specification explains that this makes the vessel more suitable for pulling a wake boarder or water skier.[177] The two elements of this invention, water vessels and chairs, are certainly well known in the art. However, the combination of the two for the purpose of enhancing a wake requires more explanation in the specification. In particular, the chair must be positioned in a specific manner, works better if it is inflatable and filled with fluid, and should be made of an impermeable material so that it does not get soggy.[178] In this manner, enabling the combination of well-known elements requires some explanation in the specification, and, in this example, both "vessel" and "chair" are instances of inventive language, as they are mentioned frequently in the specification.

Thus, an element in a patent claim that is mentioned very little in the specification is unlikely to be necessary to satisfy an element of patentability, meaning that it is unlikely to be inventive. Alternatively, a patent with little-mentioned claim elements may be attempting to claim something that the patentee has not enabled or described sufficiently in the specification, meaning again that the element may not be something the patentee has actually invented. This study, therefore, uses the frequency with which a claim element is mentioned in the specification as a proxy for whether the element is inventive or non-inventive.

Measuring Element Frequency

---

[175] U.S. Patent No. 6,505,572, claim 1 (issued Jan. 14, 2003).
[176] *Id*.
[177] *Id*. at col 1, ll. 46-51.
[178] *Id*. at cols 1-3.

The sample for this study is a randomly generated[179] list of 25,000 patents filed between 1976 and 2015[180] available on the USPTO's website.[181] For each patent in this list, an algorithm was used to identify the text of the claims.[182] The claims were then broken down into individual words using the Natural Language Toolkit (NLTK), a platform to interpret textual data using Python.[183] The NLTK algorithm[184] was used to identify singular nouns within the patent claims.[185] The study is restricted to singular nouns in order to minimize false positives caused by changes in grammar such as verb tense, and from prepositions, articles, and legal language (for example, 'comprising', 'whereby', 'said', etc) which are not relevant to this study. After claim words were identified, duplicate words were removed. Due to limitations of the methodology, patents were excluded if their claims contained a molecular structure or mathematical formula. Some patents did not have text available on the USPTO's website and were excluded, leaving a total of 24,116 patents.

For each identified word in a patent's claims, the algorithm determined how many times the word appeared in the patent's specification. Reasonable minds may differ on how little a keyword must appear in the specification before we can be confident that the claim element is non-inventive. However, it seems unlikely that an element that is part of a novel and nonobvious invention can be adequately described and enabled if it is never mentioned, or mentioned only once or twice. Thus, for purposes of this study, "non-inventive" language is defined as language in a patent claim that appears in the specification two or fewer times.[186] Note that the choice of 'two or fewer' is somewhat arbitrary – it also unlikely that an element in a novel or nonobvious invention can be adequately described if it is mentioned only three or four times in the specification. Because this is the first study of its type, I chose to

---

[179] Patent numbers were generated using a random number generator.

[180] The USPTO database of full-text granted patents begins with patents granted in 1976. Note that because the number of patents granted each year has been increasing, the sample has a greater number of patents for more recent years.

[181] USPTO Patent Full-Text and Image Database, *available at* http://patft.uspto.gov/netahtml/PTO/search-bool.html.

[182] All algorithms mentioned in this section are on file with the author.

[183]Natural Language Toolkit, http://www.nltk.org/.

[184] Specifically, the "pos_tag" function.

[185] In order to minimize false results caused by use of different conjugations, as well as to minimize the amount of legal language such as "comprising" or "whereby", only singular nouns were counted for this study.

[186] To validate the choice to define non-inventive language as appearing two or fewer times in the specification, several of the analyses in Section IV were also conducted using a definition of non-inventive language of either 'appearing once in the specification' or 'appearing three or fewer times in the specification.' The directionality and significance of the results did not change.

use a low number to provide a conservative definition, thus, I can confidently say that, since the amount of non-inventive language is large using my definition, the true amount of non-inventive language is likely *larger*.

To illustrate the methodology, consider U.S. Patent No. 5,650,185. The patent claims a "non-aerosol product delivery system for use in food preparation" which produces a "uniform, widely dispersed spray pattern," which can be used to spray flavors on foods.[187] Previous spray systems were unable to deliver this uniform spray pattern, instead producing a "ragged, uneven spray."[188] The claims specify that the system may be used to deliver a variety of flavors as diverse as "rosemary" and "liver."[189] The algorithm identified the words "uniform", "spray," "rosemary," and "liver" (among others) and then determined how many times each word appeared in the specification. The patent's key advance over the prior art is the ability to produce a uniform spray, thus, the concept is discussed at length in the specification, and the word "uniform" appears 34 times and "spray" 92 times, and are therefore classified as inventive language. By contrast, the ability to incorporate rosemary and liver flavors into a spray are apparently somewhat incidental the main invention, and may have been known in the prior art, and the words "rosemary" and "liver" appear only once in the specification, and are therefore classified as non-inventive language.

Additional Data

Additional data were also collected on other characteristics of the sampled patents. Specifically, data were obtained on the number of claims, specification length, number of forward and backward citations,[190] filing date,

[187] U.S. Patent No. 5,650,185, claim 1 (issued July 22, 1997).

[188] *Id*. at col 1, ll. 39-40.

[189] *Id*. at claims 11, 13. Specifically, the claims read "wherein said oil-based liquid food flavor concentrate is further defined as comprising one or more selected from the group consisting of…[rosemary]…[liver]…" *Id*.

[190] Obtained from Google's patent files. Forward citation counts include citations through May 4, 2015. Forward citations are widely used as a proxy for patent value, under the theory that more important patents will be cited more often. *E.g.*, Bronwyn H. Hall et al., *Market Value and Patent Citations: A First Look*, 13-20 (Nat'l Bureau of Econ. Research Working Paper No. 7741, 2000); Dietmar Harhoff et al., *Citations Frequency and the Value of Patented Inventions*, 81 REV. ECON. & STAT. 511 (1999); Jean O. Lanjouw & Mark Schankerman, *The Quality of Ideas: Measuring Innovation with Multiple Indicators* (Nat'l Bureau of Econ. Research, Working Paper No. 6297, 1999); Manuel Trajtenberg, *A Penny for your Quotes: Patent Citations and the Value of Innovations*, 21 RAND J. ECON. 172 (1990). Note that forward citations are not considered a precise proxy. C. Gay & C. Le Bas, *Uses Without Too*

grant date, prosecution length,[191] whether the application was a continuation or continuation-in-part of an older application, NBER industry classification,[192] and maintenance data.[193]

Application Data

Further data were obtained on the amount of non-inventive language in the original application and the change in non-inventive language between the original application and the granted patent.[194] Note that the full text of patent applications is only available for applications filed in 2001 or later, thus only 8,974 of the patents in this sample had a corresponding application available.

An additional 15,000 applications were randomly selected.[195] This sample includes applications that both were and were not ultimately granted. I used data provided by Michael Frakes and Melissa Wasserman[196] to determine whether each application had been rejected during prosecution on any of the following bases: 101,[197] 102,[198] 103,[199] 112 paragraph 1,[200] 112 paragraph 2.[201]

Many Abuses of Patent Citations or the Simple Economics of Patent Citations as Measure of Value and Flows of Knowledge, 14 ECONOMICS OF INNOVATION AND NEW TECHNOLOGY 333, 335 (2005). Backward citations may correlate with patent breadth, likelihood of validity, and patent value, although these correlations are speculative. Dietmar Harhoff, Frederic M. Scherer, Katrin Vopel, *Citations, Family Size, Opposition, and the Value of Patent Rights*, 1596 RESEARCH POLICY 1, 8 (2002).

[191] All dates obtained from Google's patent files. Prosecution length was calculated by subtracting the filing date from the grant date (note that this does not account for continuations).

[192] NBER's technology classification was obtained from the USPTO's PatentsView search tool. USPTO, *Data Download Tables*, http://www.patentsview.org/download/.

[193] Maintenance data was obtained from a USPTO bulk download file hosted by Reed Tech. Reed Tech, *Patent Maintenance Fee Events*, http://patents.reedtech.com/maintfee.php.

[194] This was done by comparing text of applications to the text of the granted patent (both obtained from the USPTO's website). Full code on file with the author.

[195] The random sample was generated by taking a random selection of application numbers from the replication data file for Michael Frakes & Melissa Wasserman, *Is the Time Allocated to Review Patent Applications Inducing Examiners to Grant Invalid Patents?*, REVIEW OF ECONOMICS AND STATISTICS (2016), *available at* https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/ABE7VS.

[196] *Id.*

[197] 35 U.S.C. § 101 (rejection for lack of utility or lack of patentable subject matter).

[198] 35 U.S.C. § 102 (rejection for anticipation).

[199] 35 U.S.C. § 103 (rejection for obviousness).

[200] 35 U.S.C. § ¶ 1 (rejection for lack of written description, enablement, or best mode).

[201] 35 U.S.C. § ¶ 2 (rejection for indefiniteness).

Synonyms

Data used for the initial analysis captures only verbatim repetition of a claim word in the specification, not use of synonyms. Verbatim repetition was chosen for the primary level of analysis because the use of synonyms is discouraged in patent drafting.[202] Thus, counting frequency with which an element recurs in the specification is unlikely to significantly understate the amount of information provided by a patent. However, in order to verify this assumption, the methodology was repeated with an algorithm designed to capture synonyms of claim words.[203]

The synonym-capturing algorithm likely overestimates the number of synonyms, and thus underestimates the amount of non-inventive language. This occurs because the algorithm for accounting for synonyms likely captured a large number of false positives, because it sought synonyms across all senses of a word, many of which may not be true synonyms of the claim word. For example, if a claim directed to methods of organizing a law school curriculum included the word 'course,' the algorithm would search the specification for 'course' and synonyms including 'class', 'line', 'trend', 'path', and 'track'. While 'class' is true synonym of 'course' as it is used in the context of the claim, 'line' is not. Thus the true difference between the results when accounting for synonyms and when not accounting for synonyms is likely overstated due to methodological limitations.

The default algorithm does *not* include synonyms, thus, unless otherwise specified all figures and calculations do not include synonyms. Note that although including synonyms reduces the amount of non-inventive language slightly (see Figure 2), it does not change the directionality of any results.

Limitations

This Article employs the number of times a word appears in the

---

[202] Jay P. Lesser, *Drafting Claims for Chemical and Pharmaceutical Patent Applications*, in PLI ADVANCED PATENT PROSECUTION WORKSHOP 2013: CLAIM DRAFTING & AMENDMENT WRITING COURSE HANDBOOK 3 (2013) ("Claim terms should be used consistently in a patent application…as courts may interpret the same term in different claims and in related patent applications in the same manner."). *See also*, Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed. Cir. 2005) ("Because claim terms are normally used consistently throughout the patent…"); Markman v. Westview Instruments, Inc., 52 F.3d 967, 980 (Fed. Cir. 1995) ("For claim construction purposes, the description [in the specification] may act as a sort of dictionary, which explains the invention and may define terms used in the claims.").

[203] To identify synonyms, the algorithm uses WordNet, a lexical database developed by Princeton University. https://wordnet.princeton.edu/.

specification as a measure of the inventiveness of the word. It is, of course, a proxy, and therefore not a perfect measure of inventiveness. For one, the frequency measure is only effective to distinguish between inventive and non-inventive language, and does not measure the level of inventiveness across patents once the inventive threshold has been met. For example, a claim element that is mentioned only once in the specification is unlikely to be inventive, but there is not necessarily a difference in inventiveness between an element that is mentioned 30 times in one patent and an element that is mentioned 60 times in another patent.

A second note is that counting the number of times a claim element is mentioned in the specification likely *underestimates* the amount of non-inventive language in the claims. A claim element that is not mentioned in the specification is likely non-inventive, but the reverse is not true: an element that is mentioned several times in the specification is not necessary inventive. In addition, the methodology divides claims into individual words, rather than terms. In some cases, the words may be prevalent in the specification while the term is not, producing a false negative by this methodology. For example, the Federal Circuit affirmed a finding of invalidity for lack of written description when the term "selling computer" was "not present anywhere in the specification or original provisional application."[204] The patent at issue in that case did not contain the term "selling computer" in the specification but did contain the individual words "selling" and "computer." Consequently, the true prevalence of non-inventive language in patents is likely even higher than found in this study.

An additional set of limitations results from the computer-based nature of the study. First, the analysis is limited to nouns for accuracy, though this likely means that the study fails to account for some non-inventive language. Second, the analysis does not account for typos or other clerical errors. Of potential significance, the analysis does not capture situations where a species is claimed, but the genus (and not the species) is described in the specification. This scenario may be particularly common in Markush claims, as these claims describe a genus.[205] However, if a species is not described in the specification, that species is arguably not part of the core invention, even if other species in the genus might be. Finally, this analysis does not search drawings. Thus, it may overestimate non-inventive language for patents that rely heavily on drawings. This may have a particularly large effect on mechanical patents, where drawings are common, but less of an effect on, for example, chemical

[204] Driessen v. Sony Music Entertainment, __Fed. Appx. __, (Fed. Cir. 2016)
[205] MPEP § 803.02.

patents, where drawings are not common.[206]

III. RESULTS

Each of the 25,000 patents in the sample was analyzed to determine how many times words appearing in claims appeared in the specification. Non-inventive claim language is enormously prevalent in many patents: approximately one quarter of all claim language is non-inventive. This Section begins with an example to illustrate the use of non-inventive claim language and then proceeds to quantitative analysis of the data. Summary statistics and a regression analysis of all data collected are available in Appendices A and B.

U.S. Patent No. 7,776,844 is an example of a patent with a significant amount of non-inventive claim language. The patent claims a composition (related to the herbicide Roundup®)[207] "for treatment of a cosmetic condition or dermatological disorder."[208] The patent further claims the composition used in combination with an agent

> selected from the group consisting of: abacavir, abciximab, acamprosate, acarbose, acebutolol, acetaminophen, acetaminosalol, acetazolamide, acetic acid, acetohydroxamic acid, N-acetylcysteine and its esters, N-acetylglutathione and its esters, acitretin, aclometasone dipropionate, acrivastine, acthrel, actidose, actigall, acyclovir, adalimumab, adapalene, adefovir dipivoxil, adenosine, agalsidase, albendazole, albumin, albuterol, aldesleukin, alefacept, alemtuzumab, alendronate, alfuzosin, alitretinoin, allantoin, allium, allopurinol, alloxanthine, almotriptan, alosetron, alpha tocopheral, alpha$_1$-proteinase, alprazolam, alprenolol, alprostadil, alteplase, altretamine, aluminum acetate, aluminum chloride, aluminum chlorohydroxide, aluminum hydroxide, amantadine, amifostine, amiloride, aminacrine, amino acid, aminobenzoate, p-aminobenzoic acid, aminocaproic acid, aminohippurate, aminolevulinic acid, aminosalicylic acid, amiodarone, amitriptyline, amlodipine, amocarzine, amodiaquin, amorolfine, amoxapine, amoxicillin, amphetamine, amphotericin, ampicillin, amprenavir, anagrelide, anakinra, anastrozole, anisindione, anthralin, antihemophilic, antithrombin, anti-thymocyte, antivenin, apomorphine, aprepitant, aprotinin, arbutin, argatroban, aripiprazole, arnica, ascorbic acid and its esters, ascorbyl palmitate, aspirin, atazanavir,

---

[206] Bernadette Marshall, *Better Drawings Make a Better Patent*, WORLD INTELLECTUAL PROPERTY ORGANIZATION MAGAZINE (April 2010), http://www.wipo.int/wipo_magazine/en/2010/02/article_0008.html.

[207] Monsanto, *Glyphosate and Roundup Brand Herbicides*, http://www.monsanto.com/glyphosate/pages/default.aspx

[208] U.S. Patent No. 7,776,844, claim 1 (issued August 17, 2010).

atenolol, atomoxetine, atorvastatin, atovaquone, atropine, azathioprine, azelaic acid, azelastine, azithromycin, baclofen, bacitracin, balsalazide, balsam, basiliximab, beclomethasone dipropionate, bemegride, benazepril, bendroflumethiazide, benzocaine, benzonatate, benzophenone, benzoyl peroxide, benztropine, bepridil, beta carotene, betamethasone dipropionate, betamethasone valerate, betaxolol, bethanechol, bevacizumab, bexarotene, bicalutamide, bimatoprost, bioflavonoids, biotin, biperiden, bisacodyl, bisoprolol, bivalirudin, bortezomib, bosentan, botulinum, brimonidine, brinzolamide, bromocriptine, brompheniramine, budesonide, bumetanide, bupivacaine, buprenorphine, bupropion, burimamide, buspirone, busulfan, butabarbital, butalbital, butenafine, butoconazole, butorphanol, butyl aminobenzoate, cabergoline, caffeic acid, caffeine, calcipotriene, calcitonin-salmon, calcitriol, calfactant, camellia sinensis, camphor, candesartan cilexetil, capecitabine, capreomycin, capsaicin, captopril, carbamazepine, carbamide peroxide, carbidopa, carbinoxamine, cefditoren pivoxil, cefepime, cefpodoxime proxetil, celecoxib, cetirizine, cevimeline, chitosan, chlordiazepoxide, chlorhexidine, chloroquine, chlorothiazide, chloroxylenol, chlorpheniramine, chlorpromazine, chlorpropamide, ciclopirox, cilostazol, cimetidine, cinacalcet, ciprofloxacin, citalopram, citric acid, cladribine, clarithromycin, clemastine, clindamycin, clioquinol, clobetasol propionate, clocortolone pivalate, clomiphene, clonidine, clopidogrel, clotrimazole, clozapine, coal tar, coal tar extracts (LCD), codeine, cromolyn, crotamiton, cyclizine, cyclobenzaprine, cycloserine, cytarabine, dacarbazine, dalfopristin, dapsone, daptomycin, daunorubicin, deferoxamine, dehydroepiandrosterone, delavirdine, desipramine, desloratadine, desmopressin, desoximetasone, dexamethasone, dexmedetomidine, dexmethylphenidate, dexrazoxane, dextroamphetamine, diazepam, diclofenac, dicyclomine, didanosine, dihydrocodeine, dihydromorphine, diltiazem, 6,8-dimercaptooctanoic acid (dihydrolipoic acid), diphenhydramine, diphenoxylate, dipyridamole, disopyramide, dobutamine, dofetilide, dolasetron, donepezil, dopa esters, dopamide, dopamine, dorzolamide, doxepin, doxorubicin, doxycycline, doxylamine, doxepin, duloxetine, dyclonine, econazole, efalizumab, eflomithine, eletriptan, emtricitabine, enalapril, ephedrine, epinephrine, epinine, epirubicin, eptifibatide, ergotamine, erythromycin, escitalopram, esmolol, esomeprazole, estazolam, estradiol, etanercept, ethacrynic acid, ethinyl estradiol, etidocaine, etomidate, famciclovir, famotidine, felodipine, fentanyl, ferulic acid, fexofenadine, flecamide, fluconazole, flucytosine, fluocinolone acetonide, fluocinonide, 5-fluorouracil, fluoxetine, fluphenazine, flurazepam, fluticasone propionate, fluvoxamine, formoterol, furosemide, galactarolactone, galactonic acid, galactonolactone, galantamine, gatifloxacin, gefitinib, gemcitabine, gemifloxacin, glucarolactone, gluconic acid, gluconolactone, glucuronic acid,

> glucuronolactone, glycolic acid, griseofulvin, guaifenesin, guanethidine, N-guanylhistamine, haloperidol, haloprogin, hexylresorcinol, homatropine, homosalate, hydralazine, hydrochlorothiazide, hydrocortisone, hydrocortisone 21-acetate, hydrocortisone 17-butyrate, hydrocortisone 17-valerate, hydrogen peroxide, hydromorphone, hydroquinone, hydroquinone monoether, hydroxyzine, hyoscyamine, hypoxanthine, ibuprofen, ichthammol, idarubicin, imatinib, imipramine, imiquimod, indinavir, indomethacin, infliximab, irbesartan, irinotecan, isoetharine, isoproterenol, itraconazole …[the claim continues for an addition 360 words].

Of the 662 drugs listed in this claim, none are described in examples in the specification and all are examples of non-inventive language. To be clear, this is not necessary a bad patent – the technology described by the patent may be very useful and beneficial to society. The problem with this patent is the exceedingly large number of pharmaceuticals recited in the claims that are not part of the core invention, were not tested with the core invention,[209] and may not actually work as described with the core invention.

A. Prevalence

Figure 1, below, is a histogram showing the prevalence of non-inventive language across the sample.[210] A median of 24% of claim language was non-inventive. Given that patent claims are supposed to be exclusively about the invention and entirely supported in the specification, this is unexpectedly high.

[209] Or at least, no testing is recorded in the patent.

[210] As a percentage of all analyzed words in the claims.

Figure 1: Histogram of percent non-inventive words in claims across sample

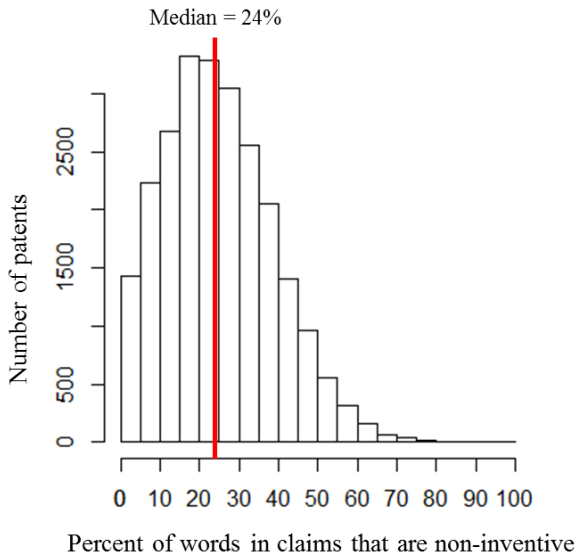


Figure 2 breaks down the 'non-inventive' measure by showing the frequency with which claim terms appear zero, once, twice, three, or four times in the specification. Approximately 8% of claim terms are simply not in the specification at all, as represented by the red bar in the histogram below. This is a surprisingly large number, given that patentees are legally required to describe the claimed invention in the specification in sufficient detail to show that the inventor was in fact in possession of the invention.[211] It is also surprising because many patent drafting guides recommend that prosecutors copy and paste the words of the claims verbatim into the specification in order to ensure that all claims are mentioned in the specification.[212] A further approximately 7% of claim terms appear only once in the specification and approximately the same number appear only twice. This means that many words in patent claims are described little, if at all, in the specification.

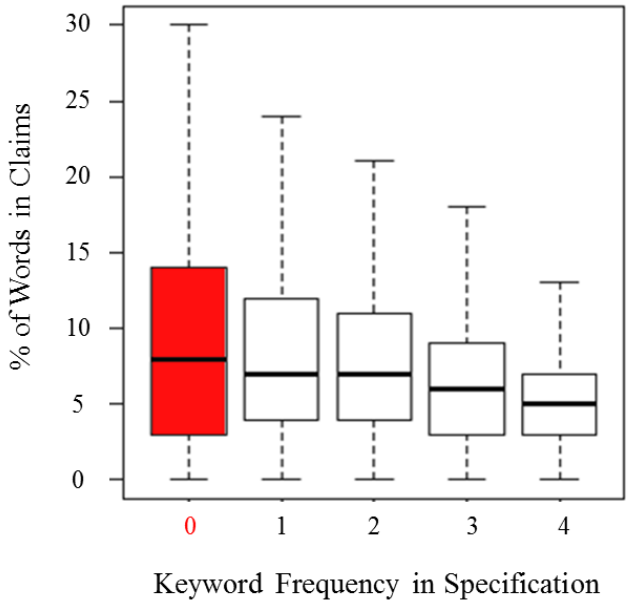
Because textual analysis can be imprecise and this methodology underestimates non-inventive language, the figures should not be taken as an exact quantification of the phenomenon. Rather, the figures and numbers below indicate that non-inventive language is pervasive and that patent claims do much more than merely describe the invention. This Article defines non-

[211] LizardTech, Inc. v. Earth Res. Mapping, Inc., 424 F.3d 1336, 1345 (Fed. Cir. 2005).

[212] *E.g.*, Adriana L. Burgy, *Drafting the Patent Specification*, AMERICAN INTELLECTUAL PROPERTY LAW ASSOCIATION PATENT BOOTCAMP, 7-3 (2009) ("The easiest way to [write the specification] is to block copy the claims with your word processing program. Then paste them into your specification document twice…").

inventive language as words appearing two times or fewer in the specification. This definition is somewhat arbitrary but, as can be seen from Figure 2,[213] the main finding (that there is a large amount of non-inventive language in patent claims) would be the same even if non-inventive language were defined as words appearing one time or fewer, or three times or fewer.

Figure 2: Boxplot of Keyword Frequency in Specification; shown as a mean % of total words in claims



[213] All boxplots in this Article were made using the default settings in R. The thick black line indicates the median value, and the upper and lower edges of the box indicate the 75% and 25% percentile values, respectively. The whiskers extend to 1.5 times the length of the box. Outliers are omitted using the function "outline=FALSE". Martin Maechler, *R Documentation*, https://stat.ethz.ch/R-manual/R-devel/library/graphics/html/boxplot.html.

Figure 3: Non-Inventive Language in Specification; excluding and including synonyms

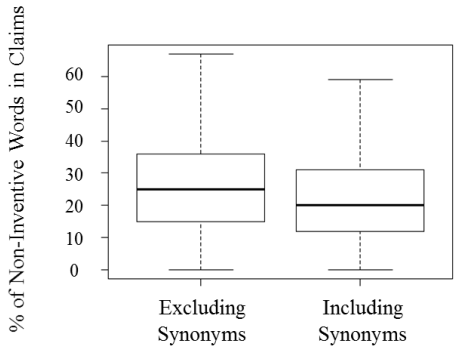


Figure 3 shows the percent of non-inventive words in the sample under two alternate methodologies: excluding and including synonyms. The box on the left shows the frequency of non-inventive language in the specification when synonyms are *not* counted in the analysis. Excluding synonyms is the default for the analysis in this paper and this model is used for all graphs below. The box on the right shows frequency of non-inventive language in the specification when the algorithm searches for both verbatim matches of a claim word in the specification and synonyms of the claim word. Thus, approximately 20% of words in patent claims are not present more than twice in the specification either verbatim or as synonyms. This compares to approximately 25% of words that are not in the specification more than twice verbatim.

B. Industry

Industry matters for patents. Although patent law is facially industry-neutral, in practice doctrine is applied in industry-specific ways.[214] As a result, patent drafting conventions differ across industries.[215] Thus, non-inventive language may be used in different ways and have different consequences depending on the industry involved in the patented technology. The figures below show that that different industries have somewhat varying rates of non-

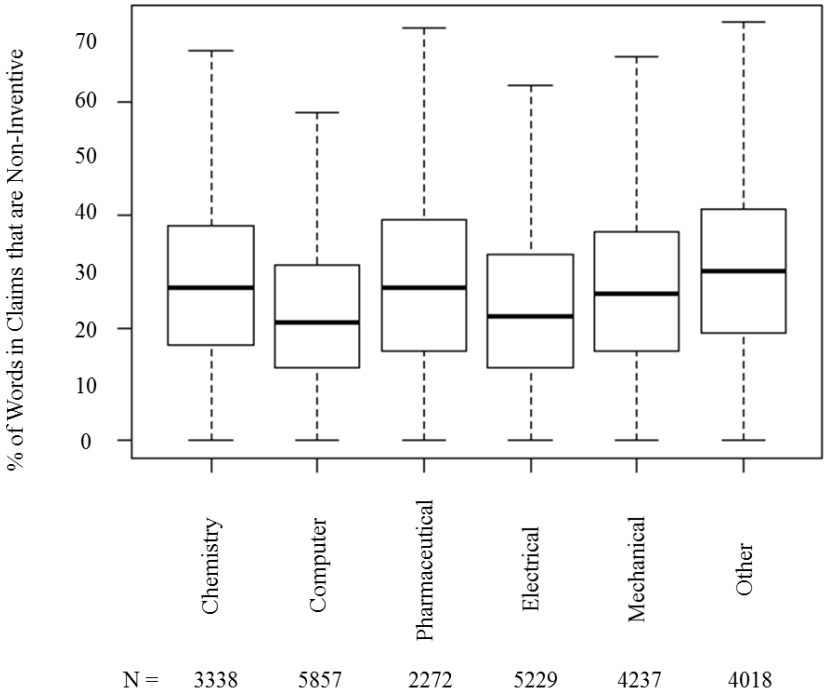
[214] Burk & Lemley, *supra* note 43, at 1577.

[215] *See, e.g.*, ROBERT C. FABER, FABER ON THE MECHANICS OF CLAIM DRAFTING § 4 (2008) (including separate subsections for method claims directed to chemical processes, electrical methods, business methods, and software).

inventive language and Section IV discusses how there are varying concerns associated with non-inventive language depending on the industry.

Figure 4 shows the percent of words in a patent's claims that are non-inventive, divided by industry. Non-inventive language is somewhat higher in the chemical, pharmaceutical, mechanical, and "other" industries,[216] as compared to the computer and electrical industries, though the magnitude of the difference is not large. Differences between all industries are significant at $p<0.01$ except the pairs chemistry/pharmaceutical and chemistry/mechanical, where the difference in percent of non-inventive language is not significant. Figure 5 further divides industries into sub-categories and shows the percent of words in a patent's claim that are non-inventive, divided by sub-industry (in the figure, sub-industries are grouped by industry, beginning with chemical, followed by computer, pharmaceutical, electrical, mechanical, and other).[217]

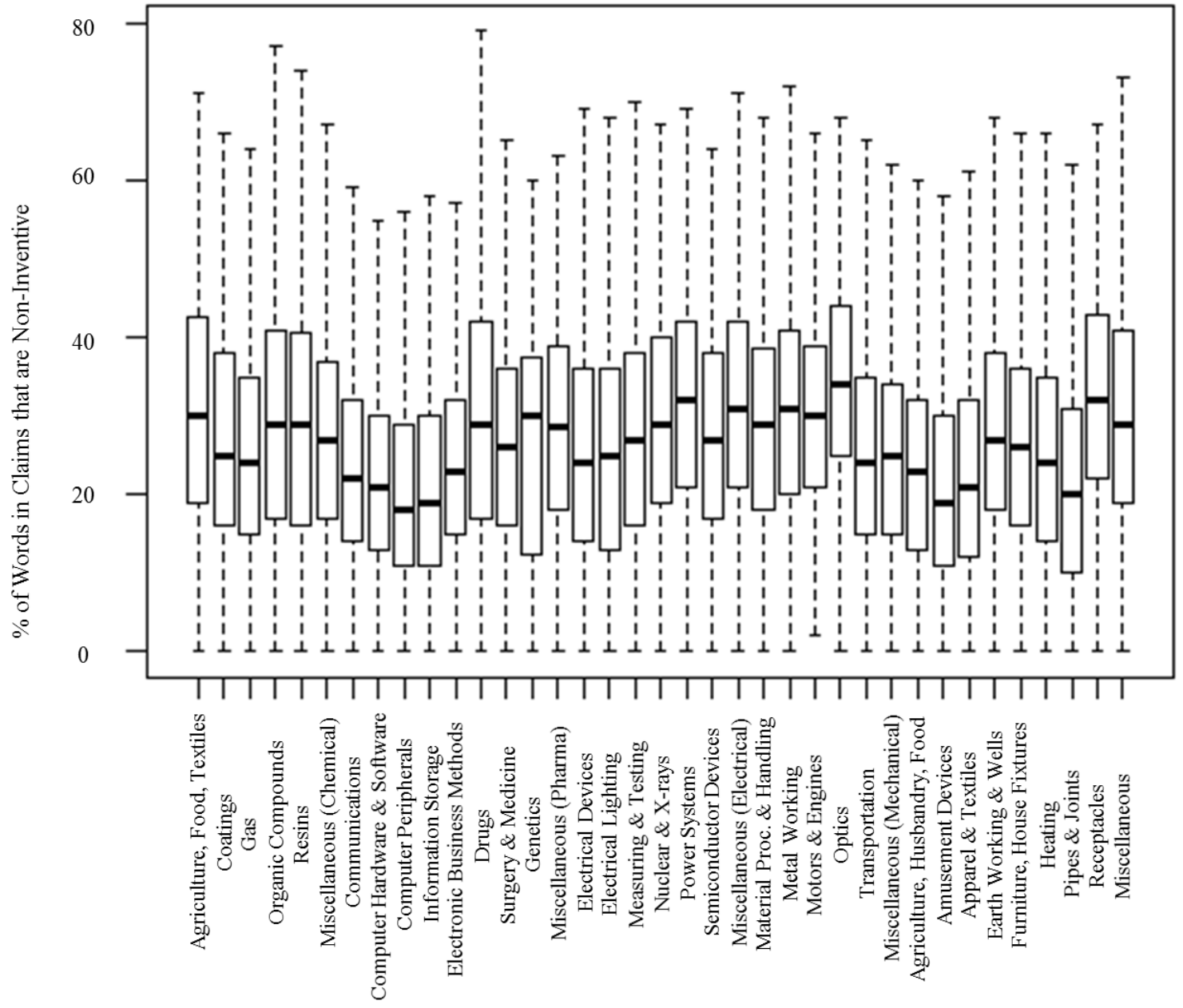
Figure 4: Non-Inventive Language by Industry



[216] "Other" includes the subcategories "Agriculture, Husbandry, Food", "Amusement Devices", "Apparel & Textiles," "Earth Working & Wells", "Furniture, House Fixtures", "Heating", "Pipes & Joints", "Receptacles", and "Miscellaneous." Categories from the NBER subindustry classification file, available through the USPTO's PatentsView Data Download. United States Patent and Trademark Office, *Data Download Tables* (July 15, 2016), http://www.patentsview.org/download/.

[217] *Id.*

Figure 5: Non-Inventive Language by Sub-Industry



C. *Application Characteristics*

Not all patent applications become granted patents. This section examines non-inventive language in a sample of 15,000 randomly selected applications and includes applications that were never granted.[218] As compared to the sample of granted patents, applications have a median of 3% less non-inventive language (Figure 6(c)).[219] This may be because as applications progresses through the examination process, it is sometimes necessary to add language to claims to overcome rejections – and the specification is rarely amended to accompany this change.[220] Thus, the claim language may diverge from the specification.

Figure 6 compares non-inventive language in applications, patents that are continuations ("Con") and patents that are continuations-in-part ("CIP"). The data show that non-inventive language increases as the time between when the specification was written and when the claims were written increases.

Sometimes, the specification language stays the same not only through claim amendments, but while filing a new application and writing entirely new claims. This type of patent is called a continuation,[221] and, because there is a great deal of distance between the filing of the specification and the eventually granted claims, one would expect to see less concurrence between the specification and the claims and more non-inventive language. As shown in Figure 6(a), this is the case. Continuations have slightly more non-inventive language than other applications or patents. Language is occasionally added to the specification in type of application called a continuation-in-part.[222] Because language is added concurrently with claim amendments in CIPs, one would expect to see higher levels of concurrence between specification and claim, and thus less non-inventive language. As show in Figure 6(a), CIPs have slightly less non-inventive language than other applications.

Scholars believe that the propensity of applicants to use continuations to obtain claims that are quite distant from the subject matter originally described in the specification is more severe in the computer industry. Figure 6(b) compares non-inventive language in continuations, CIPs, and patents that are neither continuations or CIPs. As in Figure 6(a), continuations have more non-inventive language, but the difference between continuations and other patents is twice as high for computer patents.

As a general matter, as the time between writing the claims and writing the

---

[218] *See* Section II, *supra* for a discussion of how sample was obtained.

[219] Median of 21% non-inventive language as compared to 24% for granted patents.

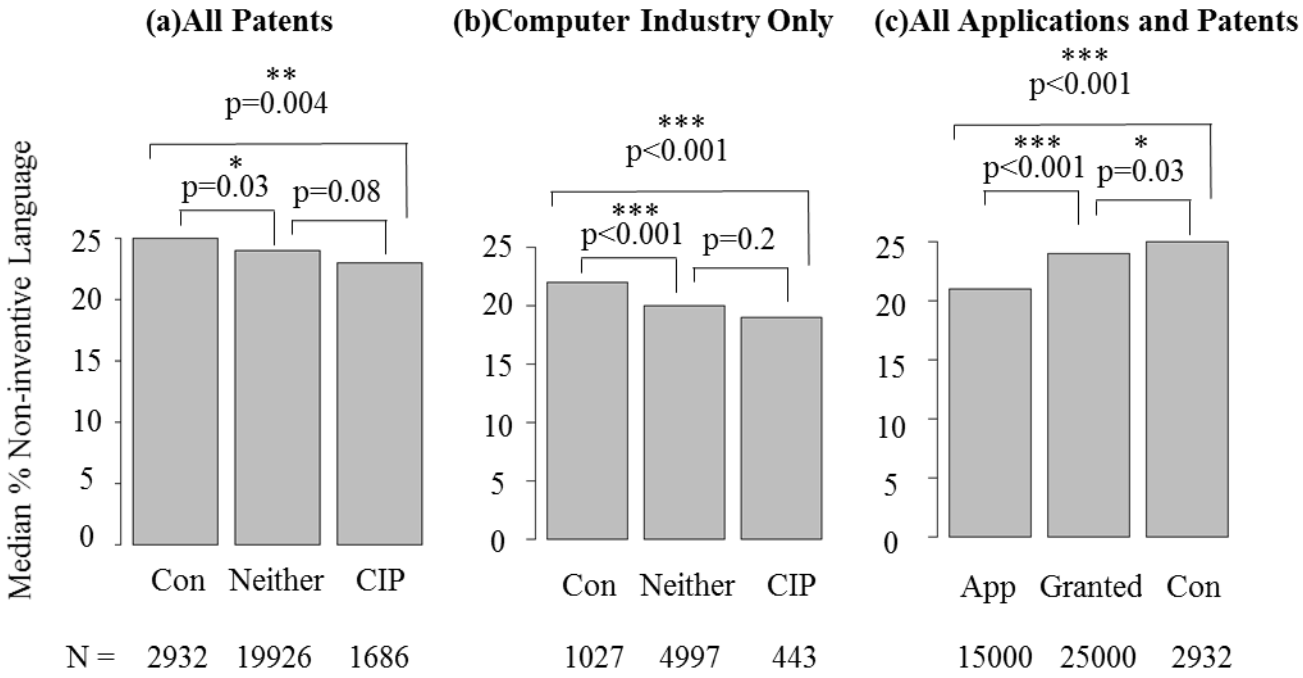
[220] *See* Janet Freilich, *The Uninformed Topography of Patent Scope*, 19 STAN. TECH. L. REV., 171 n.85 (2015).

[221] Described further in I.B.4, *supra*.

[222] MPEP § 201.08 ("A continuation-in-part is an application…repeating some substantial portion or all of the earlier…application, and adding matter not disclosed in the said earlier…application.").

specification increases, the amount of non-inventive language increases. Figure 6(c) shows that when claims and specification are written at the same time (the initial application),[223] non-inventive language is lowest. It is higher for granted patents, where the claims (but not the specification) have likely undergone some amendments since filing, and highest for continuation, where sweeping claim edits likely took place.

Figure 6: Median Percent Non-Inventive Language in Continuations, Continuations-in-Part, and other Applications



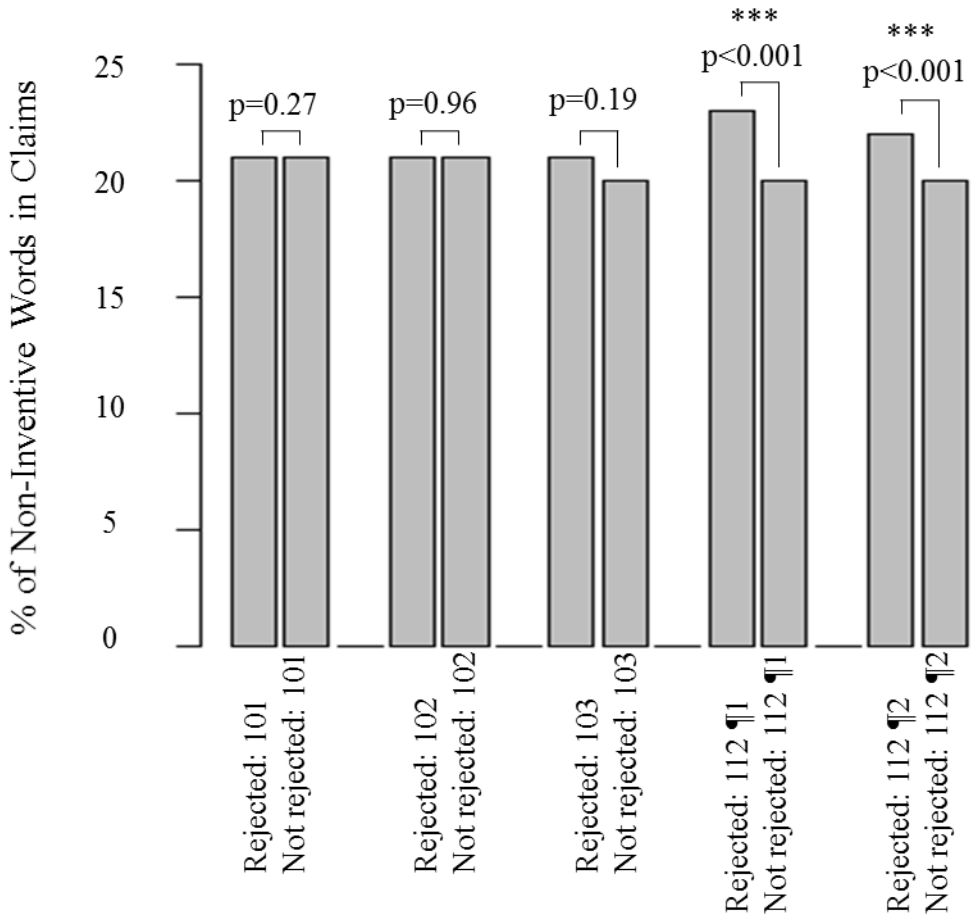
Applications with more non-inventive language also fare differently during examination. Applications rejected under 35 U.S.C. § 112 have more non-inventive language than applications not rejected under §112. Section 112 ¶ 1 rejections are for lack of enablement or written description (where language in the claims is not adequately supported by the specification) and Section 112 ¶ 2 rejections are for indefiniteness (where claim language is incomprehensible). It stands to reason that patents with a great deal of non-inventive language would be more likely to be rejected for these reasons, as the claim language is neither supported nor defined in the specification. Indeed, the examiner's stated reasons for the rejection support this. For example, one examiner complained that a claim "recites the term 'unique electronic fingerprint'…what is a unique electronic fingerprint?" and then rejected the application under §112 ¶ 2.[224] The term

[223] There are some exceptions to this rule. Claims can be amended before the application is first published (MPEP § 1121), and the specification may have been written as part of a provisional application, which does not need to include claims (35 U.S.C. § 111(b)).

[224] Application No. 20070258894, Non-Final Rejection 3 (Feb. 26, 2010).

"unique electronic fingerprint" is non-inventive language, as it is not mentioned anywhere in the specification. Interestingly, there is no difference in non-inventive language between applications rejected on non-112 grounds and their non-rejected counterparts. This is likely because these grounds for rejection have less to do with the language in the claim.

Figure 6: Rejections During Prosecution



D. Examination Characteristics

In many patents, the amount of non-inventive language in the claims changes during the prosecution process, the result of claim amendments over the course of examination before the Patent and Trademark Office. The data described in this section are based on the applications that eventually became the patents used in this study, and thus includes only granted patents.[225] The average change in number or percent of non-inventive terms is quite small (-0.2 words and 1.46%, respectively), but, because many applications added non-inventive words while many others removed non-

[225] Because the full text of patent applications is available electronically only for applications filed after 2001, a total of 8,014 of the sampled patents had applications available for comparison.

inventive words during examination, the average belies the true scope of the effect. Figure 5 shows that a plurality of patents (42%) increased the amount of non-inventive language during prosecution while many (28%) experienced no change or a decrease in non-inventive language (30%). Figure 6 shows the magnitude and variability of the change in non-inventive language during prosecution for those patents where the amount of non-inventive language increased or decreased.

Figure 7: Directionality of Change in Non-Inventive Language During Prosecution

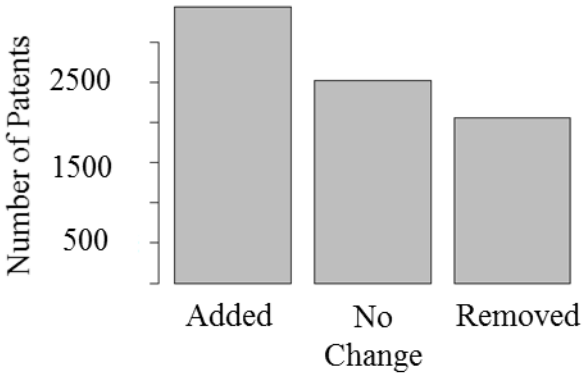
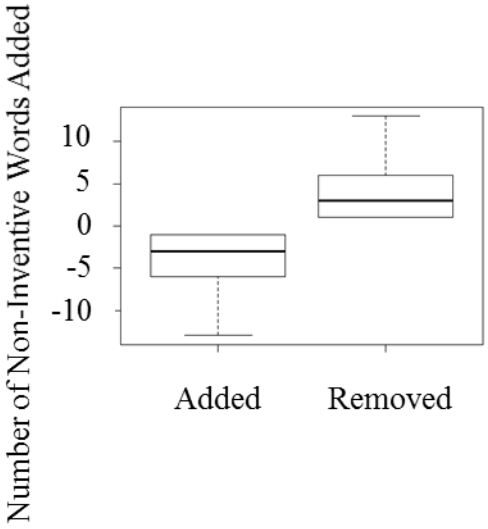


Figure 8: Magnitude of Addition/Removal of Non-Inventive Language During Prosecution



When prosecution increased the number of non-inventive terms, it was often in response to a rejection on the grounds that the claim was indefinite or overly broad. In response, the applicants added non-inventive elements to narrow or define a claim. For example, Application No. 10/097,113, claiming a labeling compound that can be attached to nucleic acids to monitor gene expression,[226] was filed with an independent claim directed to a novel compound linked to a "detectable moiety."[227] The examiner repeatedly rejected this claim on the ground that it was indefinite.[228] The examiner complained, "detectable how?...Is NMR included? How about IR?...what detection limit is required to make the group detectable?"[229] The

[226] Application No. 10/097,113, ¶ [0012] (filed March 12, 2002)
[227] *Id*. at claim 1.
[228] *E.g.*, Non-Final Rejection 7 (Jan. 7, 2003)
[229] *Id*.

examiner suggested either amending the specification or adding specific compounds to claim 1. The applicants chose the latter, adding a list of potential compounds including "a radiolabel, a magnetic particle, colloidal gold, fluorescein, texas red, rhodamine…" and almost 200 other compounds (most instances of non-inventive language, as the specification does not discuss the compounds)[230] The examiner then granted the patent.[231]

In many instances, non-inventive language was removed during prosecution, either by amending a claim to remove the language or by cutting the claim out entirely. Take, for example, Application No. 10/156,744, directed to a method of illuminating objects to improve digital capture and analysis of said objects.[232] As filed, the application contained many claims directed to uses for this method, with little description in the specification of how these applications would actually be implemented. For instance, claim 262 describes a "method and apparatus for securing an airport" including steps such as "detecting suspicious conditions revealed by x-ray images of baggage" and "running intelligent information processing algorithms [on] each passenger and baggage attribute record…in order to detect any suspicious conditions which may given [sic] concern or alarm" and, based upon these steps, "determining if a breach of security appears to have occurred."[233] The specification contains little detail about how these steps would be implemented, despite their complex nature, with the inventors merely noting that the algorithms needed for the steps "are within the knowledge of those skilled in the art."[234] The claim is, therefore, full of non-inventive language. During the examination process, the applicants entirely removed this claim, as well as many other claims containing non-inventive language, resulting in a significant reduction in non-inventive language during prosecution, and a granted patent with claims more focused on the core invention.

---

[230] U.S. Patent No. 7,468,243, claim 1 (issued Dec. 23, 2008).

[231] In a similar instance, an examiner suggested adding examples of "surface stabilizers" to a claim previously directed to the category in general in order to overcome a written description rejection. Applicant Arguments/Remarks Made in an Amendment, 1 (Dec. 21, 2005). The applicant did so, adding a list of several hundred (non-inventive) examples of surface stabilizers. U.S. Patent No. 7,276,249, claims 183-186 (issued October 2, 2007).

[232] Application No. 10/156,744, ¶ [002] (filed August 14, 2003).

[233] *Id*. at claim 262.

[234] *Id*. at ¶ [1526].

E. Patent and Claim Characteristics

a. Specification Length

Non-inventive language correlates with certain aspects of how the patent is drafted, in particular number of unique words in the claims and length of specification. Patents with the more non-inventive language have wordier claims, which is not surprising, because more words provide more opportunities for non-inventive language. Similarly, patents with more non-inventive language have shorter specifications, which is again not surprising because patents with shorter specifications will not have the opportunity to describe as many features in the claims.

b. Independent and Dependent Claims

Overall, slightly more than half of non-inventive language comes from independent claims (a median of 57% across the entire data set). This varies across industries: from a low of 50% in pharmaceutical patents to a high of 60% of non-inventive language from independent claims in mechanical patents. Only non-inventive language in independent claims narrow the overall breadth of the patent,[235] so non-inventive language affects overall scope in more than half of all patents.

c. Value Indicators

Because patentees include non-inventive language in the text of patent claims, they presumably perceive some benefit from this increase. Thus, non-inventive language increases the value of patents in some way or at least increases the perceived value of patents. It is not obvious from the empirical analysis why this is. Patents with the most non-inventive language perform poorly on proxies for value such as number of forward citations[236] and payment of maintenance fees (data in Appendices A and B).[237] Because patents with the most non-inventive language have fewer forward citations (controlled for year of grant) and lower payment of

---

[235] *See* Section I.A.2, *supra*.

[236] The number of forward citations received by a patent is thought to be a function of the value and importance of the invention to its field. *See, e.g.*, Bronwyn Hall, Adam Jaffe, & Manuel Trajtenberg, *Market Value and Patent Citations*, 36 RAND J. ECON. 16, 17 (2005).

[237] The USPTO requires patentees to pay periodic maintenance fees to prevent their patents from expiring. http://www.uspto.gov/patents-maintaining-patent/maintain-your-patent. Because these fees are not negligible, they are a proxy for the value of the patent to its owner. Only patents with a value greater than the maintenance fee will be maintained.

maintenance fees, these patents might be thought to be of lower value than patents with less non-inventive language.

However, the analysis in this study cannot account for differences in value between a patent without non-inventive language and the same patent after adding non-inventive language. It may be that patents with non-inventive language have some other feature that renders them less valuable, and that non-inventive language recoups some of the lost value. Additionally, one explanation consistent with lower citation counts is that patents with more non-inventive language are blocking downstream development in the area covered by the patent, meaning that other innovators are not creating new technologies that would cite the patent.[238]

d. Time

The amount of non-inventive language has been decreasing over time.[239] It is not clear why this is the case. It may be the result of increasingly longer specifications that presumably use more unique words.[240] Note that this does not necessarily mean that the problem posed by non-inventive language is diminished, because the reduction may simply be due to the practice of copy-and-pasting claim language into the specification more times or defensively including words in the specification without a clear purpose.[241] Alternatively, it may be in response to changing written description jurisprudence.[242]

IV. DISCUSSION AND IMPLICATIONS

Claims were created to distinctly point out the invention, resulting in a belief that claims are synonymous with the invention and that structuring a patent with separate specification and claim sections would isolate the old from the new. The results from this study suggest that the relationship between claim and invention and claim and specification is far more complex than previously though. This Section asks how these results contribute to our understanding of the practical, theoretical, and policy

---

[238] Jonathan Ashtor, *Do Valid Patents Promote Progress* (forthcoming).

[239] *See* Appendix B.

[240] Dennis Crouch, *The Rising Size and Complexity of the Patent Document*, University of Missouri School of Law Legal Studies Research Paper No. 2008-04, *available at* http://ssrn.com/abstract=1095810.

[241] *See* Kristen Osenga, *The Shape of Things to Come: What We Can Learn from Patent Claim Length*, 28 SANTA CLARA COMP. & HIGH TECH. L.J. 617, 623 (2012).

[242] Ariad Pharm., Inc. v. Eli Lilly and Co., 598 F.3d 1336, 1341 (Fed. Cir. 2010) (*en banc*).

issues surrounding patent claims.

Section A explores the practical implications of non-inventive language. It benefits patentees, but at a cost to the public. Non-inventive language may contribute to some severe and tenacious problems with patent claims, yet it also in some instances can improve the clarity and other features of patent claims. Section B questions how theorists should understand claims, since the relationship between claims and the invention is not straightforward. It proposes a framework for understanding when non-inventive language is desirable and when it is problematic. Section C expands on this framework with policy proposals for how non-inventive language can be both limited and accommodated.

A. Practice Revisited

1. Value to Patentees

As an initial matter, it is important to consider why patentees add non-inventive language to claims and how this adds value to the patent. Oddly, the value proxies measured for this study suggest that patents with more non-inventive language are *less* valuable than patents with less non-inventive language.

However, informal discussions with patent attorneys and patent examiners revealed a host of other factors that are hard to quantify but may be driving the use of non-inventive language. The discussion below explores the mechanisms by which non-inventive language may be valuable to patentees. In particular, patentees may choose to include non-inventive language for signaling purposes such as increasing the audience for their patent or advertising the functionality of their core invention, or for decoy purposes such as obscuring the core invention in a flurry of non-inventive language. Alternatively, patentees may include non-inventive language in order to "wear out" the patent examiner or as "back-up" to hedge their bets against uncertain future prosecution and litigation as well as commercial uncertainty more generally. For any of these uses, non-inventive language allows patentees to increase the amount or types of information conveyed by the patent, thereby increasing its value.

a. Signaling

Non-inventive language may increase patent value by providing an information benefit that is separate from any substantive legal effect of the

language. The concept that, "under some circumstances, the information function of patents may be more valuable to the rights holder than the substance of the rights," has been termed 'patent signaling.'[243] Patent signaling has been explored extensively in both the legal and management literature,[244] but the focus has always been on the entirety of the patent, rather than language in the claims. Nevertheless, theories of signaling apply well to non-inventive language in patent claims.

Including non-inventive information in the claims, rather than in the specification, of a patent increases the likelihood that others will find the patent.[245] Some types of patent searches search only the claims, not the specification.[246] Another signaling benefit is communication with potential infringers. A survey of patent attorneys found that including additional elements in a patent claim "is useful as a way for potential licensees to know that the proposed product is literally and explicitly covered."[247]

Language in claims can also signal information to users, researchers, or investors. This function has been examined in the context of the specification.[248] Claims can similarly be used to highlight potential uses of the core invention or complementary products, a sort of advertising function.[249] For example, a patent on fire-extinguishing microcapsules that can be incorporated into a coating for various surfaces includes in the claims a recitation that it can be used on articles such as "textile fabric",

---

[243] Clarisa Long, *Patent Signaling*, 69 U. CHI. L. REV. 625, 625 (2002).

[244] *Id*. *See also* Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 CORNELL L. REV. 1065 (2007); David B. Audretsch & Werner Bonte, *Financial Signaling by Innovative Nascent Ventures: The Relevance of Patents and Prototypes*, 41 RESEARCH POLICY 1407 (2012); Jeanne C. Fromer, *A Psychology of Intellectual Property*, 104 NW. U.L. REV. 1441 (2010); Timothy R. Holbrook, *The Expressive Impact of Patents*, 84 WASH. U.L. REV. 573 (2006); David H. Hsu & Rosemarie H. Ziedonis, *Patents as Quality Signals for Entrepreneurial Ventures*, 2008 ACAD. MANAGE PROC. 1 (2008); Gregory N. Mandel, *Proxy Signals: Capturing Private Information for Public Benefit*, 90 WASH. U.L. REV. 1 (2013); Sean B. Seymore, *The Teaching Function of Patents*, 85 NOTRE DAME L. REV. 621 (2010).

[245] Note that being found by searches is not considered advantageous by all patentees, and indeed, many patentees go to some lengths to hide their patents from searches. *See, e.g.*, Davide Russo, et al., *Functional-Based Search for Patent Technology Transfer*, Proceedings of the ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, August 12-15, 2012, Chicago, IL.

[246] For example, a clearance search.

[247] Crouch, *supra* note 256.

[248] Long, *supra* note 243 at 647.

[249] *Id*. ("[e]ven if patents conferred no protection, firms might find it desirable to obtain them as a means of credibly advertising their inventions.").

"pillow[s]", "pen[s]", "furniture", "packaging", "printer component[s]", "fuel pump[s]", "disc drive[s]", "vehicle console components", and "bellows."[250]

Alternatively, non-inventive language in patent claims may serve a "decoy" function to mislead competitors.[251] In the context of patents a whole, companies can patent numerous inventions or mechanisms in order to hide the "one good one in a flood of bad inventions."[252] In the context of non-inventive claim language, companies might include claims directed to many different possible embodiments in order to hide their true preference.

b. Insurance

Other uses for non-inventive language include "insurance" functions to hedge against some of the uncertainty of the patent application and litigation processes. It is well established that some language found in dependent claims[253] serves functions such as clarifying the language of other claims through the principle of claim differentiation,[254] or highlighting a key embodiment.[255] Because it is difficult at the drafting stage to predict what arguments might need to be made during litigation, adding a wide range of elements to claims allows for a commensurately wide range of potential arguments during litigation.

A similar "insurance" policy against findings of anticipation and non-obviousness might motivate patentees to include non-inventive elements in patent claims.[256] A patent is valid only if it is novel (not anticipated) and

---

[250] U.S. Patent No. 8,465,833, claim 28 (issued June 18, 2013).

[251] There is evidence that patents as a whole are used this way. *See, e.g.*, Corinne Langinier, *Using Patents to Mislead Rivals*, 38 CANADIAN J. ECON. 520, 523 (2005) ("There is considerable evidence that firms use 'decoy patents' to direct competitors into unprofitable fields of research.").

[252] *Id*.

[253] Patents may contain two types of claims, independent and dependent claims. Independent claims do not refer back to any other claims. 37 C.F.R. § 1.75(c). Dependent claims refer back to and limit another claim in the same patent. *Id.* Dependent claims are required by statute to be narrower in scope than the independent claims from which they depend because the dependent claims must both "incorporate by reference all limitations of the" independent claim and "specify a further limitation of the subject matter claimed." 35 U.S.C. § 112(e).

[254] *Id*.

[255] Jeanne Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719, 740 (2009).

[256] A survey by Dennis Crouch found that "back-up" in validity challenges was one of the most common purposes of dependent claims. Dennis Crouch, *Theory of Dependent Claims: Survey Results*, PATENT LAW BLOG (PATENTLY-O), *available at*

non-obvious, meaning that the invention is not disclosed in or rendered obvious by the "prior art" (information made public prior to the patent's filing).[257] The anticipation analysis requires that the party alleging patent invalidity prove that *each element* of a claim is present in one single disclosure (generally a publication).[258] Statistically, the greater the number of elements in a claim, the more difficult this will be to accomplish.

* * * * *

If non-inventive language is good for patentees, it may also be good for the public. Simplistically, if patentees benefit from non-inventive language, its presence increases the value of the patent, which ought to increase incentives for patentees to innovate.[259] However, innovation is an iterative process, and a boon to patentees may hamper downstream innovators. Indeed, non-inventive language may contribute in part to the multitude of problems associated with patent claims' clarity, readability, searchability, examinability, and compliance with disclosure requirements.[260] The Sections below explores potential roles of non-inventive language in these concerns.

2. Disclosure

Because non-inventive language often describes concepts that are far afield from the core invention, there is a risk that the language will reflect a patent claim that has gone beyond describing the invention to describing potential corollaries that the patentee does not actually possess and cannot explain how to make or use. Because patents must disclose certain information about the claimed matter, non-inventive language that describes concepts not disclosed in detail in the specification may sometimes reflect claims that are not actually valid because the claims encompass scope greater than the invention.

---

http://www.patentlyo.com/patent/200805/theory-of-depen.html.

[257] 35 U.S.C. §§ 102, 103.

[258] Merck & Co., Inc. v. Teva Pharmaceuticals USA, Inc., 347 F.3d 1367 (Fed. Cir. 2003) ("An 'anticipating' reference must describe all of the elements and limitations of the claim in a single reference…");

[259] Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 867-890 (explaining how broader patents incentivize innovation, but also explaining how broader patents can impede secondary innovation).

[260] Section II, *supra*.

Granted patents are presumptively valid[261] so, because this Article studies granted patents, the studied claim language is presumptively enabled and described. However, non-inventive language might signal non-enablement of the concepts claimed by that language, or insufficient written description. This is especially true in the unpredictable arts such as chemistry or biology. For example, given the complexity of determining if a compound can be used to treat a disease in humans, a claim directed to using a novel compound to treat various diseases, where no testing had been done, might in fact not be enabled. Though it is certainly possible for non-inventive language to be enabled and adequately described,[262] its widespread presence is at least a red flag with regards to enablement and written description, particularly in the unpredictable arts. This is supported by the finding that applications with more non-inventive language are more likely to be rejected for lack of enablement or written description (Figure 6).

A practical challenge with patents that claim greater breadth than they have enabled or described is a chilling effect on future research. A company choosing an area in which to conduct research often begins with an overview of the patent landscape. If the patent landscape appears to be very crowded, the company may choose to focus its research efforts elsewhere. The company is unlikely to spend tens of thousands of dollars sifting through patents before beginning its research program, so the presence of non-inventive claim language, which creates the appearance of a crowded landscape, is significant.

Non-inventive claim language has a further chilling effect on future research. Non-inventive language in some instances discloses an untested idea:[263] the combination of the non-inventive element and the inventive element claimed by the patent or the use of the inventive element for a non-inventive method. In this sense, non-inventive language allows patentees to precisely, but inaccurately, claim something that they have not invented. In the pharmaceutical industry, where non-inventive language is very prevalent,[264] these disclosed combinations can have surprising synergistic (or toxic) effects, or may turn out to be capable of treating an unexpected condition.[265] Thus, there is a great deal of downstream research that is

---

[261] Doug Lichtman and Mark A. Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 STAN. L. REV. 45, 46-50 (2007).

[262] The specification does not need to describe claim elements "in haec verba" Vasudevan Software, Inc. v. MicroStrategy, Inc., 782 F.3d 671, 681 (Fed. Cir. 2015).

[263] Or, if the invention has been tested, the results are not reported in the patent.

[264] *Supra* Section IV.B.

[265] G.W.A. Milne, *Very Broad Markush Claims: A Solution or a Problem? Proceedings of a Round-Table Discussion Held on August 29, 1990*, 1991 J. CHEM. INFO.

needed before such a combination can be commercialized.

Once a combination of things or a method of using something is disclosed in a patent, it becomes prior art against future patents, and renders it difficult for others to later obtain a patent on that combination or method.[266] This means that future research on the combination is hard to incentivize through the grant of patent protection, potentially diminishing research in that area. In some fields, specifically the unpredictable arts, many combinations or uses that seem very logical on paper will fail when actually tried.

For example, a patent might claim a novel molecule and further claim use of that novel molecule to treat "respiratory diseases; inflammatory diseases…allergies; ophthalmic diseases; cutaneous diseases; gastrointestinal (GI) disorders, renal disorders…Alzheimer's disease, Down's syndrome, Huntington's…" and many others.[267] However, the patent does not describe any testing of the compound for treatment of this highly-varied set of conditions (thus, it is non-inventive language), and, even if the compound were effective for all of the conditions, significant additional experimentation and many clinical trials would be needed to determine the proper dosage form, amount and regimen. Those experiments may not be done, because it will difficult for companies other than the patentee to get a patent on use of the compound to treat any of the listed conditions.[268]

& COMP. SCI., 9, 29 (1991) (saying, in the context of broad chemical Markush groups: "it inhibits somebody actually making it and it may well be that that compound has an entirely different activity which could be useful."). *See also*, Arti K. Rai & Grant Rice, *Use Patents Can Be Useful: The Case of Rescued Drugs*, 6 SCI. TRANSLATIONAL MEDICINE 1, 1-2 (2014) (discussing drugs that failed clinical trials for the predicted use, but were later found to have other therapeutic uses).

[266] Note that it is not impossible to obtain a later patent on an earlier disclosed combination if the combination has not been enabled. MPEP § 2121.

[267] U.S. Patent No. 6,277,862, claim 11 (issued August 21, 2001).

[268] The tenuousness of later patents on prior-disclosed combinations is illustrated in *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804 (Fed. Cir. 1989). In *Merck*, the plaintiff had patented a diuretic drug consisting of a combination of amiloride hydrochloride and hydrochlorothiazide and obtained FDA approval for the product. *Id*. at 805. An earlier patent had disclosed "various…guanidines, one of which is amiloride" and that these compounds "are useful in combination with other classes of diuretic agents," one of which is hydrochlorothiazide. *Id*. at 806. Although the plaintiff argued that its combination was "medically synergistic" and therefore not obvious in light of the prior disclosed combination, the court disagreed and held the plaintiff's patent invalid. *Id*. at 808-809. Fear of this outcome is likely to inhibit testing on and commercialization of previously disclosed combinations.

There is some evidence that patentees deliberately disclose more information than necessary in order to create this chilling effect. Firms leading a patent race strategically disclose information in order to "lessen the expected value of patents" that might be granted to others and to "signal the leader's relative position vis-à-vis the laggards."[269]

3. Clarity

Patent claims are hard to read.[270] One prevalent criticism is the length of patent claims – because claims must be restricted to one sentence, elongating that sentence reduces the clarity[271] of a phrase that is likely close to incomprehensible to the lay reader to begin with.[272] Non-inventive elements may number in the dozens or even hundreds. Given the already existing concerns about claim length and comprehensibility, adding large numbers of words to claims has the potential to seriously obstruct the reader's ability to grasp the meaning of patent claims. The finding (presented in Figure 6) that applications with more non-inventive language are more likely to be rejected for indefiniteness[273] supports the contention that non-inventive language diminishes claim clarity.

Non-inventive language impedes readability in another way: it is not defined in the specification. Patent claims are intended to be read "in light of the specification" [274] so when a word in a claim is ambiguous or lacks

---

[269] Douglas Lichtman, Scott Baker, Kate Kraus, *Strategic Disclosure in the Patent System*, 53 VAND. L. REV. 2175, 2179 (2000). *But see* Oren Bar-Gill and Gideon Parchomovsky, *The Value of Giving Away Secrets*, 89 VA. L. REV. 1857, 1872 (2003) (suggesting that firms strategically disclose potentially patentable information without patenting it). A survey of patent attorneys reports that "…disclosure can serve a defensive purpose: disclosure makes it more difficult for rivals to patent inventions related to the disclosed information." Scott Baker & Claudio Mezzetti, *Disclosures as a Strategy in the Patent Race*, 48 J.L. & ECON. 173, 175 (2005). Note that these comments are made in the context of disclosures in the specification, but disclosures made in the claims have the same effect.

[270] Kristen Osenga, *The Shape of Things to Come: What We Can Learn from Patent Claim Length*, 28 SANTA CLARA COMPUTER & HIGH TECH. L.J. 617, 620 (2012).

[271] Kelly Casey Mullally, *Patent Hermeneutics*, 59 FLORIDA L. REV. 334, 349 (2007) ("Intended to be a succinct statement of the invention, claims must be written as a single sentence, often requiring extreme contortions of language.").

[272] Osenga, *supra* note 27034, at 620 ("Patent claims are notoriously difficult to understand…One factor that affects comprehension of language is the word length of the passage to be understood.").

[273] A claim is rejected for indefiniteness if it, "read in light of the specification…fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." Nautilus, 134 S. Ct. at 2124.

[274] *Id*. at 2129.

clarity, the first place for the reader to turn is the specification. Non-inventive claim language is, by definition, not discussed in the specification. The reader is therefore unlikely to be able to turn to the specification for clarification if a non-inventive term should prove to be ambiguous or unclear. Though many non-inventive terms may be quite clear without reference to the specification, others are not. For example, U.S. Patent No. 4,415,459, directed to systems and methods for disposing of industrial and municipal waste,[275] includes terms in the claims such as "waste-resistant"[276] (used to describe a quality needed in an internal lining for a waste-disposal container), "vehicular access means…facilitating vehicular transport,"[277] and "space-conservative" (referring to the method of storing waste matter).[278] None of these terms are mentioned in the specification, and yet these are precisely the types of terms that litigators fight over in claim construction proceedings. Many questions can arise as to the scope and meaning of the terms. What is a "waste-resistant" lining? What types of waste need it resist? Nuclear waste?[279] Does it need to be completely waste-resistant or merely practically waste-resistant? Even very prosaic inventions can benefit from clarification of claim terms. U.S. Patent No. 5,256,432 is directed to a method of fusing pizza-topping ingredients together to create a "toppings disc."[280] Several claims include the step of fusing the ingredients by softening the cheese and then "resolidifying said quantity of cheese."[281] "Resolidifying" is not defined in the specification. Attorneys could argue all day about whether soft cheese is solid.

Of course, not all definitional problems can be solved by discussion in the specification. Language is inherently ambiguous,[282] and thus patent claims cannot be fully free of ambiguity. Yet for claim terms discussed in the specification, those seeking to understand the meaning of a claim term at least have a place to start. Not so for non-inventive language.

However, in some instances non-inventive language may actually

---

[275] U.S. Patent No. 4,415,459, col 1, ll. 6-15 (issued Nov. 15, 1983).

[276] *Id*. at claim 10.

[277] *Id*. at claim 30.

[278] *Id*. at claim 32. "Space-conservative" is part of the preamble, so it may not be a limiting part of the claim. MPEP § 2111.02.

[279] Possibly. A different claim mentions "material of relatively low nuclear radiation transmissibility." *Id*. at claim 17.

[280] U.S. Patent No. 5,256,432, claim 1 (issued Oct. 26, 1993).

[281] *Id*. at claims 4, 15, and 21.

[282] And some ambiguity may be desirable, particularly for new inventions. *See* Kristen Osenga, *Cooperative Patent Prosecution: Viewing Patents Through a Pragmatics Lens*, 85 ST. JOHN'S L. REV. 115, 148 (2011).

improve the clarity of patent claims. One challenge to claim clarity that drafting attorneys are taught to use general, rather than specific terms.[283] However, general terms can be challenging to understand. Linguistic and cognitive scientists have found that humans are best at understanding general categories when they are given several central cases or models as "exemplars".[284] Use of such exemplars can reduce notice costs of patent claims.[285]

Thus, lists of non-inventive language that may not accurately reflect what the patentee has actually invented might still add precision in a way that aids comprehensibility of patent claims. To illustrate, consider U.S. Patent 8,910,876, claiming a method for displaying programming material on a computer or related device, where the programming material is guided by a user profile.[286] Though Claim 1, an independent claim, broadly encompasses this method, Claim 5, a dependent claim, narrows the user profile to "information selected from the group consisting of…travel preferences, product preferences, dating preferences…" and several others.[287] Claim 14, also dependent, further narrows "dating preferences" to information "selected from the group consisting of…user's or prospective dating partner's…occupation, educational level, religion, family background, interest, hobbies, likes and dislikes, political orientation…" and several others.[288] Though most of this additional information is non-inventive and somewhat far afield from the core of the invention, it does clarify what the inventor meant by broader terms such as "a user profile." However, such information would be equally elucidatory if it were in the patent's specification, rather than the claims, so it is still not clear that non-inventive language has a beneficial role when it occurs in the claims.

4. Searchability

Section II.A explained how patent searches, generally keyword searches of claim language, are conducted by casting a wide net using many different keywords and then narrowing possibly relevant patents through manual review. This strategy is thorough but expensive – even if it takes only a few minutes to scan and discard a false positive, doing so for thousands of patents becomes time consuming and inefficient. The need to whittle down

[283] Particularly in independent claims.
[284] Fromer, *supra* note 255, at 765.
[285] *Id*. at 764.
[286] U.S. Patent No. 8,910,876, claim 1 (issued Dec. 16, 2014).
[287] *Id*. at claim 5.
[288] *Id*. at claim 14.

patents is a practical problem, with a survey of industry respondents finding that "there may be a large number of patents to consider initially" but only a handful that were relevant.[289] The need for complete thoroughness in these searches makes false positives inevitable and expensive.

Non-inventive language has the potential to greatly increase the number of false positives in clearance searches, exacerbating the problem of poor notice caused by the presence of an overwhelming number of patents.[290] For example, a search for granted patents claiming movies will return almost 3,000 patents, [291] including U.S. Patent No. 8,750,468. The '468 patent is directed to a method of personalizing the music or message heard while on hold on a telephone call.[292] The patent then claims methods of personalizing the call based on, among other things, "at least one movie rented" or "at least one product purchased."[293] In this patent, "movie" is non-inventive language, as the specification does not discuss movies and methods for using movies to personalize advertising for unfortunate listeners placed on hold. It is highly unlikely that this result will be relevant to a searcher seeking patents covering movies. However, this patent and others like it will be caught in the search net and will have to be manually removed. By including language in patent claims that is not part of the core invention, drafters of non-inventive language drive up the cost and complexity of searches.

5. Continuations

There are widespread suspicions that continuations include claims that go beyond the invention described in the specification or to cover applications of the patented technology that had not been invented when the application was filed.[294] Non-inventive language may be a manifestation of this problem.

For example, U.S. Patent No. 8,228,245 is directed to multiband antennas.[295] The patent is a continuation from several prior patents, the

---

[289] John P. Walsh et al., *Effects of Research Tool Patents and Licensing on Biomedical Innovation, in* PATENTS IN THE KNOWLEDGE-BASED ECONOMY 285, 286 (Wesley M. Cohen & Stephen A. Merrill eds., 2003).

[290] Section II.A.2, *supra*.

[291] Search of USPTO's Granted Patents Database for "movie" in the claims section of the patent in July 2016.

[292] U.S. Patent No. 8,750,468, col 2, ll. 11-34 (issued June. 10, 2014).

[293] *Id*. at claim 3.

[294] Cite

[295] U.S. Patent No. 8,228,245 (issued Oct. 27, 2011).

earliest of which was filed in 2001.[296] The specification, unchanged from the 2001 application, explains that the antennas can be used with devices such as "Palmtops, PDA[s], Laptops…"[297] The claims, however, were written in 2012.[298] The technologies to which antennas can be applied changed significantly between 2001 and 2012, and this change is reflected in differences between the claims and the specification. For example, the 2012 claims include use of the technology on "tablet[s]",[299] though tablets are mentioned nowhere in the specification (perhaps because they were barely invented in 2001, and were not yet popular).[300]

6. Examinability

When patents contain large amounts of non-inventive language, or when the language is sufficiently unclear or unsupported that examiners require patent applicants to remove it, the presence§ of non-inventive language may increase the time and cost of examination. It stands to reason that patent claims with a larger number of elements will take more time to evaluate. Thus, the addition of non-inventive claim elements increases the burden on examiners. Examiners have complained that "extremely long clam sets only for appearance's sake increase examination time and do not generally provide any benefit."[301]

Moreover, non-inventive language may be part of an affirmative strategy by patent applicants to 'wear down the examiner'[302] by capitalizing on overworked examiners seeking to meet their productivity quotas. For

---

[296] *Id*. at col.1, ll. 6-22.

[297] *Id*. at col.3, l.57.

[298] Application No. 12/910,016, Claims (Feb. 14, 2012).

[299] U.S. Patent No. 8228,245 at col.9, l.31.

[300] Julie Bort, *Microsoft Invented a Tablet a Decade Before Apple*, BUSINESS INSIDER (2013), http://www.businessinsider.com/heres-visual-proof-of-just-how-badly-microsoft-blew-it-with-tablets-2013-5.

[301] Lauren Anderson & Ryan Cagle, *An Examiner's Tips for Speedier Patent Prosecution*, IP WATCHDOG (Dec. 19, 2016), http://www.ipwatchdog.com/2016/12/19/examiners-tips-speedier-patent-prosecution/id=75819/.

[302] This strategy is well-established in other contexts. *See, e.g.*, (criticizing Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent Review Might Help*, 19 BERKELEY TECH. L.J. 943, 944 (2004) "[b]iased procedures that…permit[] a strategy of 'wearing down the examiner' to obtain a patent."); Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. REV. 63, 74 (2004) (describing how continuation applications "permit the applicant to wear down the examiner [and] obtain[] a patent that the PTO would otherwise refuse to grant.").

example, U.S. Patent No. 7,354,888 claims an antibacterial solution to clean various food products.[303] The patent further claims use of the cleaner on products such as "spinach, kale, chard…capon, game hen, pigeon…tuna, swordfish, [or] shark…" and many other foods.[304] If an examiner wishes to reject a claim containing such a list of alternates for obviousness or anticipation, the examiner generally need only produce prior art relating to one of the objects in the list.[305] However, the applicant can then simply amend the claim to remove that object from the list, requiring the examiner to find a different reference with a different object. For example, if the examiner were to find a reference teaching use of the claimed cleaner on spinach, the applicant could amend the claim to include only kale and chard, creating additional work for the examiner.

B. Theory Revisited

Claims were created to distinctly point out the invention and separate the new from the old. The presence of non-inventive language indicates that this separation is far from clear cut. Plainly, claims include additional information beyond the essence of the invention and thus the relationship between claims and the invention is complex and multifaceted. Claims do not entirely separate the new and the old, instead, they appear to be a combination of the new, the old, and the too new (novel ideas that the patentee has not actually figured out how to practice). The view that the claim is the invention and the invention is the claim is too simplistic; the presence of non-inventive language indicates that claims are far more intricate than previously thought.

As an initial matter, it is important to consider whether or not we can in fact accomplish the goal of precisely pointing out the invention without incorporating context, detail, or descriptions of material that has already been invented. This aspiration simply may not reflect the realities of claim drafting and the ways in which people read and understand words. Patent drafters are faced with the task of describing an invention that is entirely new without reference to the old in a way that is still understandable. Can something completely new be described with no reference to the old? It seems unlikely that this could be accomplished without a significant loss of clarity, and thus this Article takes the position that it will not be fully possible – nor is it desirable – to entirely eliminate non-inventive language.

---

[303] U.S. Patent No. 7,354,888, claim 1 (issued April 8, 2008).
[304] *Id*. at claims 32-33.
[305] MPEP § 803.

However, non-inventive language has a cost. Section A, above, explained how non-inventive language contributes to many practical problems in patent law. The original purpose of patent claims was to isolate the invention in order to avoid the confusion caused by mixing the novel aspect of the patent with other descriptive information. Congress sought to define the invention in the claims and restrict the other information to the specification. If claims contain too much non-inventive language, it negates the purpose of this separation and brings the patent system full circle back to its pre-claim condition where Justice Story complained of patents that "mix[] up the old and the new…it is impossible for the court to say what, in particular, is covered as a new invention."[306]

Given that the historical goal of complete separation of old and new may not be possible, but that non-inventive language comes at a cost to the patent system, we must consider the role that non-inventive language plays in achieving or hindering the goals of patent claims and how to calibrate it accordingly. Because patent claims are intended to convey information, the use and impact of non-inventive language can assessed through an information cost framework. Providing information can improve the clarity of legal boundaries up to a point, after which excess information muddles and confuses the audience, leading to sub-optimal results.[307] There is a tradeoff between concision, precision, and accuracy. Non-inventive language may improve the precision of patent claims, but at a cost to their concision and accuracy.

Non-inventive language in many cases increases the precision of the information conveyed by patent claims because it provides additional detail. However, increased precision comes at the cost of concision and accuracy. Concision is lost when non-inventive elements lengthen claim terms. Accuracy is lost when non-inventive elements masquerade as part of the invention or describe material that the patentee has not enabled or described in the specification.

Accuracy may be the simplest element of the framework to evaluate. We should always aim for accuracy. Non-inventive language that imagines how the invention could be used but does not reflect what the inventor has actually created has no place in patent claims. Similarly, non-inventive language that misleads readers has no place in patent claims.

---

[306] Lowell v. Lewis, 15 Fed. Cas. 1018, 1019 (C.C.D. Mass. 1817).

[307] *See* Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1, 8 (2000).

Balancing the goals of concision and precision is more difficult, because both are helpful but achieving one often comes at the cost of the other. A guiding general principle is that there is a sliding scale between the two. Some amount of language is always necessary to communicate, so complete concision is not functional. However, complete precision is also not functional because the level of detail required would be impossible both to write and to read. In the middle is an area where adding some language enhances communication but where too much language confuses and hinders information transmission and increases transaction costs. An optimal patent claim would include information up to the point where the benefits of this information are outweighed by its costs.

These principles can guide our thinking about the proper purpose and content of claims, and when non-inventive language is appropriate. Non-inventive language that creates a sentence spanning four pages or reflects concepts that are purely the patent drafter's imagination has too much precision and too little accuracy, respectively. Conversely, non-inventive language that clarifies a general concept may aid comprehension without excessively cluttering.

Our view of non-inventive language should also reflect how patents are actually used. For example, in the era before computers, the possibility that non-inventive language would create false positives in searches was not a problem, because keyword-based computer searches did not exist. It is presently a problem, but if computer scientists can create technology to clear the clutter, it may again cease to be a problem. Similarly, should we make broad advances in the pharmaceutical sciences such that experimentation becomes less unpredictable, issues of whether non-inventive language is enabled may be less pressing. This is to say that the appropriate contours of language in patent claims are not static. Patents evolve, technology evolves, and our use of patents evolves. The question of how claims should be crafted should be continually revisited in light of these changes.

1. Applying Theoretical Principles to Scholarly Debates

Given these principles, how to they apply to debates about synonymy of claim and invention, whether claims have a heart, and central vs peripheral claiming?[308] At their core, these debates are each about the extent to which claims overlap with the invention, and what should be done with the parts

[308] Each debate is described in more detail in Section I.C, *supra.*

that do not. The results of this Article contribute to the debates in two ways. First, they are empirical evidence that informs the debates. Second, because non-inventive language is a concrete manifestation of these more abstract principles, understanding non-inventive language can suggest methods to approach thinking about the principles.

a. Synonymy of Claim and Invention

I begin by considering the assumption of synonymy of claim and invention. This is an ideal that has not been well informed by empirical evidence. This study provides clear evidence that there are portions of the claim that are not the invention, and thus gives ammunition to those concerned that claims do not reflect the invention, though it does not necessarily necessitate any particular solution.

A counterargument to this interpretation of the results is that this study presents a circular argument: it begins by defining certain parts of the claim as non-inventive, so it is no surprise to find that the claim has parts that are not inventive. One might further argue that if we accept that the claim defines the invention, if the elements that I term 'non-inventive' are in the claim, then they are by definition part of the invention.

However, my argument goes beyond defining terms as inventive or not. Closer examination of many of the examples provided in this paper shows that, semantics and definitions aside, these elements should *not* be considered part of the invention. Take, for example, U.S. Patent No. 6,450,942, described above,[309] which claims "cosmic medicine" but does not mention the concept in the specification. If we consider cosmic medicine to be part of the invention, then the invention necessarily also includes ideas (because cosmic medicine is a mere idea in the mind of the inventor) and a foundational tenet of patent law is that you cannot patent an idea.[310] Thus, considering all material within the claim to be part of the invention leads to nonsensical results. The better way to understand the data presented in this study is to view the data as evidence that claims and the invention are not entirely synonymous.

b. Heart of the Claims

As with synonymy of claim and invention, the debate about whether

[309] Note 23, *supra* and accompanying text.

[310] Gottschalk v. Benson, 409 US 63, 67 (1972) (describing "the longstanding rule that an idea of itself is not patentable.").

claims have a heart – a central portion that describes the invention – has not been supported by empirical evidence. This Article does not provide evidence that claims have a heart, but it does provide evidence that claims include significant amounts of language that are clearly something *other* than the heart of the claim. Non-inventive language may be viewed as the extremities of the patent claim. Showing that claims have extremities suggests that there is some other part of the claim that is the heart.

Further, the algorithm used here could point us towards the heart of the claim. I am not advocating for a hard rule that language not appearing in the specification can never be the heart of the claim, as that would encourage game playing. Rather, when asking what constitutes the heart of the claim, we should look to the specification and see whether that term is an integral part of the invention as described in the specification.

C. Policy Revisited

Non-inventive language in patent claims has the potential to harm by hampering searches, confusing readers, hobbling examiners, and chilling future research. Yet it should not be eliminated outright because it also has the potential to help patentees navigate commercial and legal uncertainty, clarify genus claims, and possibly increase the reward to the patentee. Moreover, it may not even be possible to write claims without any non-inventive language. Thus, policy changes should be calibrated to retain as much benefit as possible while reducing harms. This Article takes a two-pronged approach to addressing non-inventive language. First, examiners should remove particularly egregious uses of non-inventive language. This includes non-inventive language that is extremely long, such as claims that stretch on for pages, and non-inventive terms that describe embodiments that the patent does not enable or describe. Section A, below, explores some mechanism for examiners to do this. Second, for non-inventive language that is not obviously harmful, Part B proposes a combination of improved search technology and better legal structures to aid readers in identifying and processing non-inventive language. Finally, Part C draws on scholarly debates about the claim's heart to propose that, given clear evidence that claims do have a heart, examiners and courts be freed from having to analyze each and every element of the claim, and instead do so only for those elements forming the heart of the claim.

1. Strategies for Removing Non-Inventive Language

a. Prolix

Some uses of non-inventive language will be particularly outrageous because they are excessively long or simply confusing. For these extreme cases, patent examiners should have tools to reject claims and require applicants to redraft.[311]

Patent examiners may reject a patent claim "as prolix" when it contains "such long recitations or unimportant details that the scope of the claimed invention is rendered indefinite thereby."[312] While examiners do reject patents for prolix, the rejection appears to be used relatively infrequently.[313] Prolix patents hide the key elements of the invention among a large amount of less relevant verbiage, making it difficult for readers to pick out the precise invention disclosed in the patent or useful details about how to make or use the invention. Frustrated courts have described patents as "a long, prolix combination with a liberal sprinkling of adverbs and almost no punctuation."[314] "All claims were prolix as they contained long recitations of unimportant details."[315] Patent claims with lengthy non-inventive sections appear to be a perfect target for a prolix rejection, although the requirement that prolixity be so extensive that the claim is "rendered indefinite thereby" may mean that prolix rejections will be viable only in cases of severe patent clutter. Nonetheless, increased use of the prolix rejection could be a tool to tackle non-inventive language in the worst cases.

---

[311] It may be best to limit examiner policing of non-inventive language to extreme cases because at some point the cost of having examiners decide whether or not to permit such language may exceed the cost to society of having the language in granted patents. For further general discussion of this concept see Andres Sawicki, *Better Mistakes in Patent Law*, 39 FLA. ST. U.L. REV. 375, 377 (2012).

[312] MPEP § 2173.05(m). *See also*, Mowry v. Whitney, 81 U.S. 620, 644 (1871) ("The law requires that every inventor, before he can receive a patent, to furnish a specification…avoiding unnecessary prolixity…"); Application of Wood, 155 F.2d 547 (CCPA 1946) ("we think it wholesome to discourage this tendency towards undue prolixity…").

[313] Dennis Crouch, The Requirement that the Written Description be Concise, Patently-O, Dec. 9, 2009 (http://patentlyo.com/patent/2009/12/the-requirement-that-the-written-description-be-concise.html) (stating that "the USPTO does reject individual claims that it deems overly wordy or 'prolix'" but that a search of the BPAI database of decisions from 1997-2009 "found only one case reviewing a rejection where the Examiner found claims invalid as 'prolix'.").

[314] Thermo King Corp. v. White's Trucking Service, Inc., 292 F.2d 668, 675 (5th Cir. 1961).

[315] Minnesota Min. & Mfg. Co. v. Norton Co., 280 F.Supp. 674, 676 (N.D. Ohio 1967).

b. Enablement and Written Description Red Flags

Some uses of non-inventive language will be particularly outrageous because they describe embodiments that are not enabled or described by the patent. The PTO is instituting several new training modules and pilot programs to address lack of enablement and written description more generally.[316] The concept of non-inventive language as described by this Article can be used to guide application of these programs in ways that will result in less non-inventive language and better adherence to the enablement and written description requirements.

For example, at present the PTO has two different standards for assessing written description, depending on whether the claim was part of the original application or was added as an amendment. For the former, the examiner is instructed to presume that there is adequate written description, and the applicant does not need to provide any specific argument that the requirement is met.[317] For the latter, there is no such presumption and the applicant is instructed to "show support in the original disclosure for the new or amended claims."[318] To reduce levels of non-inventive language that are reflective of lack of written description, the requirement that the applicant specifically point to support for amended claims could be extended to claims in the original application. This might take the form of a claim chart, where each row in the first column is a claim element and each row in the second column is support in the specification. Applicants and examiners are already used to seeing this sort of support as it is currently common for amended claims.[319]

Alternatively, the presence of non-inventive language might be used as an internal metric for the examiner to quickly find claims that might not be adequately described or enabled. The examiner could use an algorithm

---

[316] United States Patent and Trademark Office, *Examination Guidance and Training Materials*, http://www.uspto.gov/patent/laws-and-regulations/examination-policy/examination-guidance-and-training-materials.

[317] MPEP 2163.03. *See also* In re Wertheim, 541 F.2d 257, 262 (CCPA 1976).

[318] MPEP 2163.04. *See also* Hyatt v. Dudas, 492 F.3d 1365, 1370 (Fed. Cir. 2007).

[319] For example, a patent prosecution textbook recommends that when claims are amended, "[t]he basic approach applicants should use when attempting to add additional information in the application is to provide a detailed explanation of why the introduced subject matter is supported by the originally filed application. Accordingly, applicants should refer to specific portions of the originally filed application that provide support to obtain the most favorable decision from the Examiner." PATENT PROSECUTION: LAW PRACTICE AND PROCEDURE, 897 (2015).

comparable to the one developed for this Article to provide a list of claim terms that appear little in the specification, and could flag those terms for closer review. Of course, this approach might cause patent applicants to attempt to game the algorithm by repeating claim terms in the specification without any actual substantive discussion, which would not solve the problem of non-inventive language and would simply make the specification harder to read. However, at least for currently pending applications it may be a helpful strategy for the examiner. An algorithmic and automatable helper may be particularly useful because time-crunched examiners admit to often only skimming the specification.[320]

The Glossary Pilot required participants to establish the scope of a term "by presenting a positive statement of what the term means" and cannot "consist solely of a list of examples, synonyms, and/or exclusions."[321] The glossary was intended to "include definitions that will assist in clarifying the claimed invention."[322] This definitional clarification will be useful in technologies where terms are vague, such as software. In other areas, such as chemistry and pharmaceuticals, terms are not generally thought to be vague,[323] instead, the problem of non-inventive language may be more one of excessive text that may not be properly enabled or described. A Glossary-type requirement could ask patentees to create a "glossary" with an explanation of how the non-inventive element could be used with the core invention. For example, a patentee who discovered a molecule to treat diabetes but additionally claimed use of the molecule in combination with many other drugs such as "cholesterol absorption inhibitors," "fibrates," "antioxidants," and "sulfonylureas," would be asked to specify how those drugs could be used with the novel molecule.[324] This requirement would highlight claim terms that had no connection at all to the novel aspect of the patent as well as claim terms where the patentee would be unable to provide a detailed or substantial explanation. It would further create a cost in

---

[320] Lauren Anderson & Ryan Cagle, *An Examiner's Tips for Speedier Patent Prosecution*, IP WATCHDOG (Dec. 19, 2016), http://www.ipwatchdog.com/2016/12/19/examiners-tips-speedier-patent-prosecution/id=75819/ (Citing an interview with an examiner where the examiner stated "that one view is that the drawings and claims are most important during review of a patent application and the specification is mostly skimmed.").

[321] US Patent and Trademark Office, *Glossary Pilot Program: Frequently Asked Questions*, http://www.uspto.gov/sites/default/files/patents/init_events/faq_glossaryapplicant_07012014.pdf

[322] *Id*.

[323] Freilich & Kesan, *supra* note **Error! Bookmark not defined.Error! Bookmark not defined.**, at 3.

[324] U.S. Patent No. 7,759,366 (issued July 20, 2010).

attorney time to adding additional claim elements, which might dissuade their inclusion if the terms are of little importance to the patentee. However, care must be taken in adding prosecution expenses for patentees, as the patenting process is already prohibitively expensive for some inventors.[325]

2. Strategies for Adapting to Non-Inventive Language

a. Better Searching

Certain problems relating to non-inventive language, such as increased search costs, can be at least partially addressed through improvements in technology. Search algorithms could use the frequency with which a word appears in the specification, the proxy used by this Article, as a factor in ranking results by relevance (though again, this would be open to gaming by patentees). Alternatively, search services could give users the option not to return results if the results included non-inventive language. Search algorithms could use the methodology developed by this Article as a springboard to implement far more complex methods of sorting results including, for example, determining whether non-inventive language appeared as part of a set of possibilities, a list of exemplars, or an enumeration of limitations. Each category would have different value to searchers depending on the particular goal of the search, and sophisticated searchers would greatly benefit from the ability to identify and exclude those that were less relevant. These more complex methods would presumably be secret and proprietary and might therefore also be harder for patentees to game.

A further possibility is to use legal approaches to facilitate better searching. For example, Peter Menell and Michael Meurer have suggested in other contexts that applications be required to indicate structures and materials corresponding to claim terms by hypertext.[326] Menell and Meurer's suggestion is in the context of means-plus-function claims, but it could be expanded to other types of claims. If applicants had to highlight portions of the specification corresponding to a particular claim term, it would be very clear when claims were non-inventive because no language or little language would be highlighted. This would not remove non-inventive language, but it would emphasize its presence, allowing readers to

[325] *E.g.* Tamara Monosoff, *Don't File for That Patent Yet*, ENTREPRENEUR (Feb. 8, 2010) https://www.entrepreneur.com/article/204918

[326] Peter Menell & Michael Meurer, *Notice Failure and Notice Externalities*, 5 J. LEGAL ANALYSIS 1, 33 (2013).

easily skip over it, or perhaps allowing search engines to easily de-emphasize it in search algorithms.

Note that even if the solution is technological, there is value to discussions questions such as that of non-inventive language in legal articles. That search engines have not yet developed algorithms to avoid non-inventive language suggests that they may not be aware of it. Legal studies of patent text by lawyers deeply familiar with patents play a role in enhancing our understanding of the characteristics of and problems with patent text. This enhanced awareness allows computer scientists to craft technological solutions where appropriate.

b. Removal to the Specification

Many of the problems with non-inventive language come down to distractions – to searching, examining, or reading – posed by the language. These distractions would be minimized if non-inventive claim language were moved to the specification. Indeed, to the extent that non-inventive language is used to provide specific examples of a more general category or to speculate on possible uses for a technology, it belongs in the specification. The purpose of the specification is to contain such examples and descriptions of such methods.

The downside of moving non-inventive language from the claims to the specification is that patentees would no longer be able to use these claims as backup during litigation. However, the effect of this loss is mitigated because patentees could still use non-inventive language (in the specification) as backup during prosecution, by drafting new narrower claims based on the language in the specification if the broader claim was rejected.[327] After grant, it is also possible to narrow claims in reissue proceedings.[328] Moreover, as non-inventive language seems to describe concepts that the patentee has not only never made or used, but has not even bothered to elaborate upon in the specification, it seems equitable to reduce the patentee's ability to use such language as backup in patent claims, particularly when the language is harmful to third parties. A further problem with moving non-inventive language to the specification is that it may then require readers of patent claims to cross-reference claims with the specification to fully understand the claim. This is already a significant problem (most notably in means-plus-function claims).

[327] There would be no new matter rejection because the language would already be in the specification. MPEP § 2163.

[328] 35 U.S.C. § 251.

Below are several modest approaches for encouraging patentees to move non-inventive language from the claims to the specification. First, courts could adapt the doctrine of claim differentiation to encompass "genus/species differentiation." The doctrine of claim differentiation is premised on the principle that differences "among claims can…be a useful guide in understanding the meaning of a particular claim term."[329] Specifically, "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim."[330] The doctrine is used during claim construction, a process in which courts construe the meaning of terms in claims.[331]

At present, claim differentiation is an incentive to put non-inventive language in patent claims, because it gives litigators a tool that they would not have if the language were only in the specification. However, semantically, there is no reason to restrict the doctrine of claim differentiation to the claims. It would work equally well if it was phrased "the presence of a species in the *specification* gives rise to a presumption that the genus is not limited to that species." If the specification mentioned the genus/species relationship and the claim was directed to the genus, the construing judge could use the specification as a guide to the scope of the claim, as is already done in many other contexts.[332]

An additional strategy for encouraging removal of non-inventive language from the claims to the specification is training examiners to recommend such a course of action. In several applications cited above,[333] examiners suggested that patentees claiming a broad genus either give examples in the specification or replace the broad genus with examples in the claims. Patentees responded by adding dozens (or hundreds) of non-inventive elements to the claims.[334] Though it is beneficial for examiners to reject overly broad claims, examiners should be encouraged to do so by asking for elaboration in the specification[335] or by suggesting that the claim

---

[329] Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed. Cir. 2005).

[330] *Id*.

[331] Markman v. Westview Instruments, Inc., 517 U.S. 370, 389 (1996).

[332] Phillips, 415 F.3d at 1300.

[333] Section III.D, *supra*.

[334] *Id*.

[335] Patent applicants are often concerned about amending the specification because it may trigger a change in the priority date of the application. However, at least as a theoretical matter, if a claim could be amended to include additional terms, the terms are not new matter, and therefore applicants should be able to add the terms to the specification

be amended to include a small number of narrower categories, rather than an open-ended suggestion to add examples to the claims. Note that the suggestion to ask for examiner action should be used minimally and cautiously, as examiners are already overworked. Here, it would only replace rejections that examiners are already writing, and so would not add to their workload.

c. Recognize the heart of the patent

Scholars have suggested giving courts the flexibility to avoid addressing every element of a patent claim.[336] They note that "[a] surprisingly large number of claim construction disputes turn out to be unnecessary…" Courts have begun to do this in certain cases. For example, the Federal Circuit in *Cox Communications v. Sprint Communications* explained that because the "point of novelty" resided in particular terms, that indefiniteness of other terms was not fatal.[337] Although ideally a claim would not have non-inventive terms, if it does, and the term it not vital to the case at hand, it seems better for courts to avoid long and expensive battles over the term's interpretation.

CONCLUSION

Patent claims have been in serious trouble for a long time and efforts to fix them have not been successful. In this Article, I propose that one problem with patent claims is "clutter" – non-inventive language that pads claims and extends them beyond easy readability. I analyze 25,000 patents (and a further 15,000 applications) and additionally provide closer case studies of a small portion of this sample in order to uncover and understand non-inventive language. I find that approximately 25% of claim language is non-inventive, and that it appears across industries. Although claims with more non-inventive language are not more valuable by conventional value proxies, I suggest other ways, including signaling and strategic purpose, that non-inventive language increases patent value.

The presence and prevalence of non-inventive language –

---

without altering the priority date. *See* MPEP § 2163.07.

[336] E.g., Burk & Lemley, *supra* note 9, at 1797 ("courts need not construe every term in a claim, or even every term about which the parties might disagree.").

[337] *E.g.*, Cox Communications v. Sprint Communications Co., (Fed. Cir. 2016). For further discussion of *Cox Communication*, see Dennis Crouch, *Point of Novelty Returns to Indefiniteness Analysis*, PatentlyO (Sep. 23, 2016), http://patentlyo.com/patent/2016/09/returns-indefiniteness-analysis.html.

foreshadowing inventive uses, drawing readers and searchers to claims, or providing additional descriptive detail – is troubling as a matter of policy because it confuses the boundaries of the patent claim. Non-inventive language likely causes harm to the public in the form of increased search costs, potentially invalid patents, chilling future research, rendering patents more difficult to read and understand, and increasing the Patent Office's cost of examination.

Non-inventive language in patent claims is also troubling as a matter of patent theory. Patent claims are thought to be synonymous with the invention. But if claims are synonymous with the invention, why do claims contain so much language that is irrelevant to the invention? Large volumes of non-inventive claim language suggest that claims are not entirely the same as the invention, but serve some alternative or additional function.

Further, close analysis of non-inventive language shows the disparity between claim and invention even more closely. For example, a patent on a novel molecule that can be used "in medicine" claims use of that molecule to treat a wide range of diseases such as "osteoarthritis", "anxiety", "Alzheimer's", "alcoholism", "asthma" and many others, though the patent describes no research on these diseases and provides no detail on how the compound might treat these diseases.[338] It strains credulity that the same molecule might be able to treat this diverse array of conditions, especially when the patentee has provided no tests or other evidence. The patent claims treatment of these diseases but such treatments are plainly not part of the invention.

Empirical studies of patent law are growing in popularity. However, they are predominantly about patent litigation. Studies of litigation ignore the 99.8% of patents that are never litigated, and also often focus only the opinion and litigation-related documents, rather than the underlying patent. This Article is an attempt to provide insight into the text of the patent document because the text is the foundation of the patent right and the underlying cause of the oft-studied litigation. By providing one of the first empirical windows into the actual language of the patent document, it is my hope that this Article initiates further studies of and discussion on this topic.

* * *

[338] U.S. Patent No. 6,277,862, claims 13-26 (issued Aug. 21, 2001).

APPENDIX A: SUMMARY STATISTICS BY QUARTILE
GRANTED PATENTS

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
Mean % Non-inventive Language	8.96	20.48	30.72	45.88
Mean % of Non-inventive Language in Independent Claims	54.02	54.82	57.04	61.59
Mean Priority Date	2001	1998	1994	1991
Mean Filing Date	2003	1999	1995	1992
Mean Grant Year	2006	2002	1998	1994
Mean Prosecution Length (Years)	2.81	2.71	2.51	2.30
Mean Number of Non-Inventive Words Added/Removed During Prosecution (Absolute Value[339])	3.08	3.19	4.43	6.62
Mean Forward Citations/Year	1.44	1.51	1.37	1.01
Mean Backward Citations	31.89	26.13	20.59	15.01
Mean Number of Claims	15.09	16.43	15.88	13.09
Mean Length of Specification (Words)	10,741	6,776	4,692	3,319
% of Patents That Are Continuations	11.19	12.38	12.81	12.30
% of Patents That Are Continuations-in-Part	7.06	7.53	7.98	6.19
% Having Year 4 Maintenance Fee Paid	82.72	83.81	83.31	78.49
Industry (NBER Categories) (% of Total Sample in Quartile)				
Chemical	10.88	12.54	14.49	15.56
Computer	30.48	28.19	21.31	12.45
Pharmaceutical	8.30	7.98	9.05	10.17
Electrical	25.72	21.22	19.54	17.21
Mechanical	14.69	16.18	17.77	20.03
Other	9.93	13.90	17.84	24.58

[339] Absolute value is shown here because applications both added and removed non-inventive language during prosecution, thus, absolute value is a better representation of the magnitude of the change. Change in language during prosecution is discussed in more detail in Section IV.D, *supra*.

APPENDIX B: OLS REGRESSION: GRANTED PATENTS

Dependent variable: percent of non-inventive language in patent claims
Standard error in brackets
*p<0.05; **p<0.01; ***p<0.001

Variable	(1)	(2)	(3)	(4)
Number of Claims	-0.002	0.021**		-0.085***
	(0.007)	(0.007)		(0.007)
Specification Word	-0.475***	-0.460***		-0.394***
Count (in thousands)	(0.010)	(0.010)		(0.010)
Priority Date			-0.522***	-0.529***
			(0.009)	(0.013)
Prosecution Length				0.092
				(0.060)
Forward Citations/Year				-0.093***
				(0.030)
Year 4 Maintenance Fee Paid[340]				-1.579***
				(0.236)
Backward Citations				0.001
				(0.002)
Industry [341] (chemical)		4.411***	1.044***	2.192***
		(0.296)	(0.291)	(0.319)
Industry (computer)		-0.737**	-0.411	-0.113
		(0.254)	(0.246)	(0.270)
Industry (pharmaceutical)		5.175***	2.225***	3.999***
		(0.341)	(0.329)	(0.361)
Industry (mechanical)		3.312***	1.810***	1.932***
		(0.275)	(0.269)	(0.291)
Industry (other)		6.452***	4.822***	4.715***
		(0.280)	(0.273)	(0.296)
R^2	0.09	0.13	0.18	0.19
N	24,116	24,116	24,116	24,116

[340] Dummy variable set at 1 if the fee was paid and 0 if not. For this variable, patents granted in 2012 or later were excluded because this Article's analysis was done before the maintenance fee was due.

[341] The electrical industry was used as the reference sector.