

Ex Post Claiming

Tun-Jen Chiang[†]

The claims of a patent are often compared to the fences of real property. But unlike real property, these fences can be moved. I call this “ex post claiming.”

Ex post claiming creates two important problems. First, it permits patentees to cover more than what they actually invented, conferring an inefficient windfall. Second, it places the onus of discerning the true scope of a patent on competitors, increasing transaction costs. At the same time, some room for correcting claims may be necessary to avoid over-detering claim drafting mistakes.

This Article argues that the present scope of ex post claiming is too broad. Instead, it should be permitted only where (1) the patentee is remedying a prior mistake and not capturing later insight; and (2) enforcing the claim as written would inflict loss that is disproportionate to the harm caused by the mistake.

INTRODUCTION	2
I. THE FOUR STAGES OF CLAIMING.....	6
A. Filing.....	6
B. Rewriting	8
1. Finding support in the specification.	9
2. The limits of prior art.	13
3. The process of claim amendment.	13
C. Litigating	15
1. Solving the riddle: the patentee’s objective in litigation.	16
2. Distorting patent scope in favor of the patentee.	16
D. Reclaiming	20
1. Reissue and reexamination.	21
2. Continuation applications	24
3. Comparing continuations and reissue proceedings.....	27
E. Summary.....	28
II. THE ECONOMICS OF <i>EX POST</i> CLAIMING.....	29
A. Capturing Later Information.....	32
B. Allocating the Risk of Claim Mistake.....	39

[†] Assistant Professor of Law, George Mason University School of Law. Many thanks to John Duffy, Mark Lemley, Doug Lichtman, Robert Merges, and Sam Vermont for comments and insights that I have *ex post* claimed.

1.	Negligence.....	40
2.	Strict Liability.....	42
3.	The Importance of Causation.....	44
III.	SUGGESTED REFORMS.....	45
A.	Reintroduce the Late Claiming Doctrine.....	46
B.	Impose an Appreciation Requirement.....	48
C.	End Post-Issuance Claim Amendment.....	49
D.	Tie Intervening Rights to Competitor Reliance.....	50
E.	Abolish the Doctrine of Equivalents.....	54
	CONCLUSION.....	57

INTRODUCTION

Ask any patent lawyer what the most important part of a patent is, and the answer will invariably be “the claims.”¹ According to the conventional wisdom, claims define the invention, define the patentee’s right to exclude, and “inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known which features may be safely used or manufactured without a license and which may not.”² This conventional wisdom is embodied in the axiom that “it is the claim which measures the grant to the patentee,”³

My goal in this Article is to challenge this conventional wisdom, or at least qualify it. In practice, the claims provide no meaningful measure of the patentee’s rights and no reliable notice to the public. This is because claims can be *changed* throughout the patent’s lifetime. An analogy to real property would be permitting someone to rewrite the boundary and move the fence to enclose their neighbor’s new house, and then to evict the neighbors for trespassing. Such a movable fence would be both manifestly unfair and useless in defining property rights.

¹ See Mark A. Lemley, *The Changing Meaning of Patent Claim Terms*, 104 Mich. L. Rev. 105, 105 (2005) (“The claims of a patent are central to virtually every aspect of patent law.”); John F. Duffy, *On Improving the Legal Process of Claim Interpretation: Administrative Alternatives*, 2 Wash. U. J.L. & Pol’y 109, 109 (2000) (“Claims are the most important part of the modern patent document.”); Paul M. Janicke, *When Patents Are Broadened Midstream: A Compromise Solution to Protect Competitors and Existing Users*, 66 U. Cin. L. Rev. 7, 16 (1997) (“entirety of patent law centers around” claims), Giles S. Rich, *Extent of Protection and Interpretation of Claims – American Perspectives*, 21 Int’l Rev. Indus. Prop. & Copyright L. 497, 499 (1990) (“the name of the game is the claim”) (quoted in *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998)).

² *Permutit Co. v. Graver Corp.*, 284 U.S. 52, 60 (1931); see *PSC Computer Prods., Inc. v. Foxconn Int’l*, 355 F.3d 1353, 1359 (Fed. Cir. 2004); *Ortho Pharmaceutical Corp. v. Smith*, 959 F.2d 936, 943 (Fed. Cir. 1992).

³ *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 336 U.S. 271, 277 (1949).

In comparison, virtually every patent involves some degree of claim changing in hindsight, which I shall call *ex post* claiming. This occurs through three primary avenues. First, during initial prosecution after filing of the application, a patentee can redefine the invention by amending claims.⁴ Second, in litigation, a patentee can seek to “interpret” claims in creative ways.⁵ Third, even after losing in litigation, the patentee can seek to reexamine or reissue the patent,⁶ or prosecute a continuation application,⁷ to further modify his claims. Because these avenues can remain open for the entire life of the patent,⁸ there is no finality until the patent expires twenty years after filing.⁹ And because a claim that can be changed at will is virtually meaningless, the limits on such claim changing—the specification and the prior art—provide the real measure of the patentee’s rights.¹⁰

Although individual methods *ex post* claiming have been analyzed,¹¹ the *ex post facto* nature of claiming itself has generally escaped scrutiny. The analysis for disparate methods of *ex post* claiming, however, shares many common traits. *Ex post* claiming methods are commonly defended on the grounds that patentees do not fully appreciate the nature of their invention until later insights arise,¹² and

⁴ 37 C.F.R. § 1.111(c) (2006).

⁵ *Superguide Corp. v. DirecTV Enters.*, 358 F.3d 870, 878-81 (Fed. Cir. 2004) (interpreting claim to cover digital television signals that were not available at the time of patent filing).

⁶ See 35 U.S.C. §§ 251 (reissue), 301 *et seq.* (reexamination) (2000).

⁷ 35 U.S.C. § 120 (2000).

⁸ Mark A. Lemley and Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U.L. Rev. 63, 64 (2004) (“One of the oddest things about the United States patent system is that it is impossible . . . to ever finally reject a patent application.”).

⁹ 35 U.S.C. § 154 (2000) (expiration).

¹⁰ *Gentry Gallery v. Berkline Corp.*, 134 F.3d 1473, 1480 (Fed. Cir. 1998) (patentee entitled to rights “as broad as the prior art and his disclosure will allow.”).

¹¹ See, e.g., Lemley & Moore, *supra* at note 8, at 77-78 (criticizing continuations but approving of reissue proceedings to correct errors); Michael J. Meurer & Craig Allen Nard, *Invention, Refinement and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents*, 93 Geo. L.J. 1947, 1994-95 (2005) (criticizing doctrine of equivalents but endorsing reissues and continuations); Janicke, *supra* at note 1, at 40 (criticizing doctrine of equivalents but advocating intervening rights under reissue); Charlie Lisherness, Note, *Patent Reissue Genus Claims: Harmful Evolution*, 26 T. Jefferson L. Rev. 85 (2003) (criticizing broadening reissues).

¹² *SmithKline Beecham Corp. v. Excel Pharms., Inc.*, 356 F.3d 1357, 1364 (Fed. Cir. 2004) (justifying doctrine of equivalents because of “the patentee’s inability to claim unforeseeable new matter”); *In re Wilder*, 736 F.2d 1516, 1519 (Fed. Cir. 1984) (justifying reissue because “failure to appreciate the full

that patentees will inevitably make claim drafting mistakes that can be exploited by competitors.¹³ Contrary to the practice's defenders, these represent the precise *problems* with *ex post* claiming, not its redemption.

First, permitting patentees to cover later insights is equivalent to permitting patentees to obtain monopoly rights over something they did not actually invent, either by covering new competitor products or avoiding newly discovered prior art. This results in a windfall gain to the patentee. Because the windfall gain is unexpected at the time of filing, there is relatively little increase in the incentive to innovate given the risk discounting that must be applied.

Second, even when *ex post* claiming is not used to cover later innovations, and instead used only to correct good faith mistakes in articulating the actual invention at the time of filing, the availability of *ex post* claiming inefficiently shifts the risk of claim drafting mistakes from patentees to competitors.¹⁴ Because patentees thus benefit from their own mistakes, they have no incentive to avoid them; instead, competitors who bear the risk must take preventative measures to avoid the risk. Obviously, a patentee can be expected to know his *own* invention and avoid claim drafting mistakes at relatively low cost; while competitors can only discern claim drafting mistakes by the patentee at great cost, if such avoidance is even feasible. Placing the risk of drafting mistakes and the onus of avoiding them on competitors is a misguided allocation of the risk that increases the transaction costs of the patent system.

scope of the invention is one of the most common sources of defects in patents"); Stephen T. Schreiner & Patrick A. Doody, *Patent Continuation Applications: How the PTO's Proposed New Rules Undermine an Important Part of the U.S. Patent System with Hundreds of Years of History*, 88 J. Pat. & Trademark Off. Soc'y 556, 557 (2006) (arguing that continuations are necessary because many patentees "have no idea" whether their invention will be successful).

¹³ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 731 (2002) (justifying doctrine of equivalents because "the nature of language makes it impossible to capture the essence of a thing in a patent application"); *Grant v. Raymond*, 31 U.S. (6 Pet.) 218, 242 (1832) (justifying reissue because inventor should not be penalized for "an inadvertent or innocent mistake"); Pavan K. Agarwal, *Patenting in Line with the Federal Circuit*, 13 Fed. Cir. B.J. 395, 423 (2003) (noting that "continuation applications permit the patentee to *undo* mistakes (at least considered as such in hindsight)" (emphasis in original)).

¹⁴ Richard A. Posner, *Economic Analysis of Law* § 4 (6th ed. 2003) (risk of mistake should generally be allocated to party who can best avoid the mistake); see Guido Calabresi, *The Cost of Accidents: A Legal and Economic Analysis* 139 (1970).

The problems created by *ex post* claiming are plain. However, there is an important countervailing consideration: not all claim drafting mistakes are avoidable at low cost, and not all competitors will suffer harm from those mistakes.¹⁵ Society would not benefit if patentees spent millions of dollars in attorneys fees to avoid a claim drafting mistake when the mistake causes competitors only hundreds of dollars in losses. Over-punishing injurers (whether a tortious driver or a bad claim drafter) can be as problematic as under-punishing.

A complete prohibition on claim modification could lead to devoting excessive amounts of time and money on avoiding claim drafting mistakes and confer windfall gains upon accused infringers. If competitors never see the mistake-infected patent, they cannot be deceived by the mistake, and the mistake thus causes no harm. Allowing *ex post* claim changing to remedy *harmless* mistakes is efficient, because it prevents patentees from devoting excessive resources to *ex ante* claim drafting.

Reform of *ex post* claiming practice, therefore, should preserve the ability to modify claims where (1) the patentee is not capturing later insights but rather is remedying a mistake in articulating a prior insight; and (2) the harm to competitors attributable to the mistake is minimal. As time progresses in the life of a patent, the likelihood of capturing later insights increases because there are more later insights to capture. Similarly, publication of the issued patent increases the likelihood of detrimental reliance on the published claim by competitors. I propose a solution where claim amendments should be permitted only before a patent issues, and only when the patentee can demonstrate that an amendment covers a feature that was regarded as novel at the time of filing. By limiting claim amendment to early in the life of the patent, the risk of abuse by patentees is minimized; while providing at least some grace period for patentees to remedy *bona fide* mistakes reduces the likelihood of inefficient over-investment in claim drafting.

Part I of describes the methods of *ex post* claiming and the law that supports the practice, as well as its modest limits. Part II details the problems of *ex post* claiming and the limited reasons to allow some *ex post* claiming despite those problems. Part III proposes several reforms that follow from the solution of allowing claim changes only prior to patent issuance, and only with proof that the amendment is to remedy a mistake instead of capturing later insights. A brief conclusion follows.

¹⁵ Douglas Lichtman, *Substitutes for the Doctrine of Equivalents: A Response to Meurer and Nard*, 93 Geo. L.J. 2013, 2016 (2005) (“Accurate claim language is not always within reach.”).

I. THE FOUR STAGES OF CLAIMING

A. *Filing*

The first step to obtaining a patent is to invent something that is patentable.¹⁶ Once this is done, an inventor must submit a patent application.¹⁷ The application contains a written description of the invention (often known as the specification) and a set of claims “particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.”¹⁸

At first blush, these provisions seem redundant: the applicant is required to describe his “invention” in both the specification and the claims.¹⁹ The difference is best illustrated by history.²⁰ The early Patent Acts did not require claims—all the applicant was statutorily required to do was file a written description of the invention.²¹ The problem with this regime was that an inventive idea usually resided within a larger machine or process, and the invention thus combines the old with the new.²² A broad description of the entire machine would fail to separate the innovative from the prior art; but a narrow

¹⁶ Generally speaking, an invention is patentable if it is new, useful, nonobvious, and within the classes of patentable subject matter. 35 U.S.C. §§ 101–103 (2000).

¹⁷ A patent application should contain (1) a written description and claims, (2) the inventor’s oath certifying that he believes himself to be the first inventor of the invention, (3) drawings of the invention, and (4) an application fee. 35 U.S.C. § 111 (2000); 37 C.F.R. § 1.51 (2006).

¹⁸ 35 U.S.C. § 112 (2000). Strictly speaking, the “specification” includes the claims. *Id.* However, common usage limits the specification to the written description, and I shall do so here.

¹⁹ See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 736 (2002) (“What is claimed by the patent application must be the same as what is disclosed in the specification.”).

²⁰ *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1560-61 (Fed. Cir. 1991) (noting that the duplication “may seem anomalous”).

²¹ See Patent Act of 1790, § 2, ch. 7, 1 Stat. 109 (requiring “a specification in writing, containing a description . . . so particular . . . as not only to distinguish the invention or discovery from other things before known and used, but also to enable a . . . person skilled in the art or manufacture . . . to make, construct, or use the same”); Patent Act of 1793, § 3, Ch. 11, 1 Stat. 318 (requiring inventor to submit “a written description of his invention . . . in such full, clear and exact terms, as to distinguish the same from all other things before known, and to enable any person skilled in the art . . . to make, compound, and use the same”).

²² Howard T. Markey, *Why Not the Statute?*, 65 J. Pat. Off. Soc’y 331, 333-34 (1983) (“[E]very invention is formed of ‘old elements’ . . . Only God works from nothing. Man must work with old elements.”); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1540 (Fed. Cir. 1983).

description of the inventive idea in isolation would deprive a reader of context, making it difficult if not impossible to properly practice the invention.²³

This tension came to a head in *Evans v. Eaton*.²⁴ In *Evans*, the patent described a “Hopperboy” machine with some improvements; however, there were no claims on what the invention was.²⁵ The Court noted that the patent did not make clear whether the patent was for every part of the entire machine or just one component.²⁶ The Court held that if the patent covered everything in the entire machine described, it was too broad;²⁷ but if it was only a smaller part, the specification did not particularly point out *which* part, and thus was invalid also.²⁸ In the wake of *Evans*, any patentee who invented only a *part* of a larger machine or process (which is virtually every patentee) was required to state specifically which part was his invention. From this evolved the explicit claiming requirement.²⁹

Thus, there is a useful division of labor between the specification and the claims.³⁰ The specification describes an entire machine or process to provide context, and the claims point to what the inventor regards as the invention and delineates the exclusionary right.

Moreover, a new machine may have *many* innovative new parts, and a new idea may have several layers of abstraction. Patent law permits

²³ Then as now, the written description was required to “enable any person skilled in the art” to make and use the invention. Compare Patent Act of 1793, § 3, Ch. 11, 1 Stat. 318 with 35 U.S.C. § 112 (2000). Failure to do so would result in an invalid patent.

²⁴ 20 U.S. (7 Wheat.) 356 (1822).

²⁵ The first patent claims are usually dated to Robert Fulton’s patent on the steamboat, in 1809. William Redin Woodward, *Definiteness and Particularity in Patent Claims*, 46 Mich. L. Rev. 755, 758 (1948). Oliver Evans’ patent was issued in 1808 and contained no claims. See *Evans v. Eaton*, 16 U.S. (3 Wheat.) 454, 457 & n.2 (1818).

²⁶ 20 U.S. at 428.

²⁷ *Id.* at 431 (“the verdict of the jury negated the right of the plaintiff, as the inventor of the whole machine” because the jury found that another inventor had also invented a Hopperboy machine first).

²⁸ *Id.* at 433-35 (holding that a patentee “ought to describe what his own improvement is, and to limit his patent to such improvement”).

²⁹ This claiming requirement was codified in the next Patent Act. Patent Act of 1836, § 6, ch. 357, 5 Stat. 117 (stating that the inventor shall “deliver a written description of his invention . . . and shall particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery” (emphasis added)).

³⁰ Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 Colum. L. Rev. 839, 844-45 (1990).

patentees to have multiple claims to cover these variations.³¹ Within broad limits, the patentee may claim as many different features of his invention, at as many different levels of abstraction, as he likes.³² If the patentee regards 100 features as inventive and worthy of protection, he can file 100 claims, or even 1000 claims, claiming each of those features.³³ There is no *ex post* claiming problem when these claims are filed in the original application.

The ideal of a clean division of labor between a specification that serves as the technical disclosure, and the claims that delineate the property right, however, is complicated by the fact that the claims can be changed whereas the specification cannot.³⁴ This process of redefining the invention in hindsight begins with patent office amendments, as described below.

B. Rewriting

The process of *ex post* claiming begins in the patent office, when the applicant amends his claims. An applicant has broad freedom to amend his claims, subject to two substantive limitations.³⁵ First, the claimed invention, as amended, must be disclosed in the specification.³⁶ Second, the claimed invention, as amended, must not cover what is already in the public domain.³⁷ The specification and the

³¹ 35 U.S.C. § 112 (permitting dependent claims).

³² Under rule changes that have been enjoined from taking effect, patent applicants filing more than 25 claims must submit an “examination support document,” showing the closest prior art references after a prior art search has been conducted. Patent and Trademark Office, *Changes To Practice for Continued Examination Filings*, 72 Fed. Reg. 46716, 46836 (Aug. 21, 2007). Applicants would retain the entitlement to file unlimited claims.

³³ The PTO charges a fee of \$210 for each independent claim in excess of 3, and a fee of \$50 for each claim in excess of 20. Patent and Trademark Office, *Revision of Patent Fees for Fiscal Year 2007*, 72 Fed. Reg. 46899, 46901 (Aug. 22, 2007) Thus, filing 1000 claims would be something of an expensive proposition.

³⁴ 35 U.S.C. § 132 (2000) (prohibiting adding “new matter” to the specification).

³⁵ There are some immaterial requirements of form. For example, the Patent Office requires claims to be written as a single sentence. U.S. Patent and Trademark Office, *Manual of Patent Examining Procedure* § 608.01(m) (8th ed. 2001); see *Fressola v. Manbeck*, 36 USPQ2d 1211 (D.D.C. 1995).

³⁶ 35 U.S.C. § 112 (2000).

³⁷ The “prior art” in patent law refers to virtually all public knowledge at the time of the patentee’s invention. It includes all published material anywhere in the world, even if there is only a single copy. See *In re Hall*, 781 F.2d 897, 900 (Fed. Cir. 1986) (single thesis in a university library is prior art). It also includes all prior public displays and public offers in the United States, even if it was only a single occurrence. 35 U.S.C. § 102 (a). The prior

prior art are the only real limits to a patentee's rights, as otherwise "an applicant is entitled to claims as broad as the prior art and his disclosure will allow."³⁸

1. Finding support in the specification.

Section 112 requires that the specification contain a "description" of the claimed invention that "enables" a person of ordinary skill in the art to practice it.³⁹ These are distinct requirements, but they are closely related and both serve to ensure full disclosure of the invention by the patentee.⁴⁰

In theory, the written description requirement is designed "to prevent an applicant from later asserting that he invented that which he did not."⁴¹ To meet this requirement, the description must "reasonably convey" that the patentee had "possession" of the later claimed subject matter at the time of patent filing.⁴² A description must contain "sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date" of the patent application.⁴³

The primary problem with the written description requirement and this "possession" test is its unpredictability.⁴⁴ "Possession" is not a

art also includes all previously filed patent applications, even if they were held in secret at the time of the patentee's invention. 35 U.S.C. § 102(e).

³⁸ *Gentry Gallery v. Berkline Corp.*, 134 F.3d 1473, 1480 (Fed. Cir. 1998) (quoting *In re Rasmussen*, 650 F.2d 1212, 1214 (C.C.P.A. 1981)). There are a few additional and rarely-invoked substantive limits on patents. Phenomena of nature, abstract ideas, and mental processes are not patentable. *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972). Nuclear weapons are unpatentable. 42 U.S.C. § 2181 (2000). Finally, inventions with absolutely no utility are not patentable. *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1571 (Fed. Cir. 1992).

³⁹ 35 U.S.C. § 112 (2000).

⁴⁰ See *Kennecott Corp. v. Kyocera Int'l, Inc.*, 835 F.2d 1419, 1421 (Fed. Cir. 1987).

⁴¹ *Amgen Inc. v. Hoechst Marion Roussel*, 314 F.3d 1313, 1330 (Fed. Cir. 2003).

⁴² *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983).

⁴³ *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997).

⁴⁴ See, e.g., Mark D. Janis, *On Courts Herding Cats: Contending with the "Written Description" Requirement (and Other Unruly Patent Disclosure Doctrines)*, 2 Wash. U. J.L. & Pol'y 55, 69 (2000) ("especially egregious" in its uncertainty); Paula K. Davis, *Questioning the Requirement for Written Description: Enzo Biochem v. Gen-Probe and Overly Broad Patent Cases*, 37 Ind. L. Rev. 467, 474 (2004) (describing "extremes" of variance in approaches); Benjamin Hattenbach, *On Illuminating Black Holes in Patent*

particularly clear concept when applied to intangible ideas, and the courts have articulated nothing specific about what it means.⁴⁵ One likely reason for the continued ambiguity is an inherent tension between meaningful limits on patent scope and the ability to cover later derivative works.⁴⁶ If patentees were strictly limited to their literal disclosure, then an infringer could create a derivative work that “borrows” heavily from a patentee’s research, but has sufficient changes to avoid paying royalties.⁴⁷ Because the goals of limiting the patentee to what he actually invented while ensnaring infringers who create derivative works that go (just slightly) beyond what the patentee invented are in contradiction, courts assess the sufficiency of description “on a case-by-case basis.”⁴⁸ Not surprisingly, outcomes vary dramatically.⁴⁹

The second problem is that, to the extent a standard for “adequate” description can be discerned, it is widely regarded as very lenient.⁵⁰ A good example of such lenity is *Vas-Cath, Inc. v. Mahurkar*,⁵¹ where the Federal Circuit held that a set of drawings—with no description whatsoever—perfectly embodied the later claims, despite a district

Disclosures, 38 Hous. L. Rev. 1195, 1222 (2001) (“Uncertainty regarding application of the written description requirement . . . has existed for years.”).

⁴⁵ 3 Donald S. Chisum et al., *Chisum on Patents* § 7.04[e] (2007) (describing various articulations of the standard).

⁴⁶ See Janicke, *supra* at note 1, at 13 (noting that the importance of covering not just “the design that the inventor originally developed” but also “a host of other designs” to prevent evasion). Cf. 17 U.S.C. § 106(2) (2000) (granting copyright protection to derivative works, which patent law lacks).

⁴⁷ This tension has received more exploration in the area of the doctrine of equivalents. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 607 (1950) (expanding coverage of patent because otherwise the “unscrupulous copyist” would “make unimportant and insubstantial changes” and be free from liability). It inheres equally in the issue of patent scope.

⁴⁸ *In re Wilder*, 736 F.2d 1516, 1520 (Fed. Cir. 1984).

⁴⁹ Compare *Lizardtech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336 (Fed. Cir. 2005) (broad claim beyond literal embodiments invalid) with *JVW Enters., Inc. v. Interact Accessories*, 424 F.3d 1324 (Fed. Cir. 2005) (broad claim beyond literal embodiments valid).

⁵⁰ See, e.g., James Bessen & Michael J. Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* 10 (2007) (“often this requirement is not rigorously enforced”); Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards*, 17 Berkeley Tech. L.J. 623, 641 (2002) (describing the “liberal” standard of written description). The possible exception is biotechnology. See Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology Specific?*, 17 Berkeley Tech. L.J. 1155, 1156 (2002) (describing “stringent” written description requirement for biotechnology patents).

⁵¹ 935 F.2d 1555 (Fed. Cir. 1991).

court having noted that the drawings depicted numerous features and pointed to no particular aspect as being novel.⁵²

The third problem with the written description requirement is also demonstrated by *Vas-Cath*, which is the rule that literal description of the invention is always sufficient, even if the description contains a laundry list of numerous features.⁵³ A more extreme demonstration of this problem is *Snitzer v. Etzel*,⁵⁴ where the court held that a laundry list of eighty-seven *billion* ions nonetheless described the one single ion that was later claimed.⁵⁵ While some cases do require a more specific identification of particular items when a laundry list is presented,⁵⁶ this requirement is enforced only rarely.⁵⁷

Finally, only the technical aspects of an invention must be described;⁵⁸ there is no need to describe why an invention is valuable or useful.⁵⁹ In short, the written description requirement does not

⁵² *Id.* at 1565.

⁵³ *In re Smith*, 481 F.2d 910, 914 (C.C.P.A. 1973) (“where there is exact correspondence between the claim language and original specification disclosure, the description requirement would normally be satisfied”); see *Regents of Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997) (“An adequate written description of a DNA . . . requires a precise definition, such as by structure, formula, chemical name, or physical properties.”); but see *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 968 (Fed. Cir. 2002) (rejecting adequate description when “the claim language appears in *ipsis verbis* in the specification” because the description was purely functional and not structural).

⁵⁴ 465 F.2d 899, 902 (C.C.P.A. 1972).

⁵⁵ *Id.* at 903.

⁵⁶ See *In re Ruschig*, 379 F.2d 990, 994-95 (C.C.P.A. 1967) (“We are looking for blaze marks which single out particular trees. We see none.”).

⁵⁷ Indeed, *Ruschig* is the most famous case where a laundry list has been rejected, but the court could not articulate a clear basis for its rejection, reasoning that the laundry list both enabled and described the invention. *Id.* at 996 (“We have a specification which describes appellants’ invention. The issue here is in no wise a question of its compliance with section 112 . . .”).

⁵⁸ *Lockwood*, 107 F.3d at 1572 (adequate description of invention by describing “all its claimed limitations”).

⁵⁹ United States Patent and Trademark Office, *Manual of Patent Examining Procedure* § 2107 (8th ed. 2001) (utility can be proven later by extrinsic evidence if not readily apparent); *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 959 (Fed. Cir. 1983) (“If a party has made, sold, or used a properly claimed device, and has thus infringed, proof of that device’s utility is thereby established.”); see *In re Malachowski*, 530 F.2d 1402, 1403-04 (C.C.P.A. 1976) (rejecting argument that “[p]roof of utility must be commensurate in scope with the allegations of utility set forth in the disclosure”); cf. *In re Schoenwald*, 964 F.2d 1122, 1124 (Fed. Cir. 1992) (“no utility need be

prevent patentees from covering later insights, such as experiments that validate an invention, or business judgment regarding what is commercially viable.⁶⁰

Complementing the written description requirement, the enablement requirement limits the patentee's claims to what is taught by the specification. Enablement asks whether the specification contains a disclosure sufficient to "teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation."⁶¹

There is considerable debate about what the precise differences between the enablement the written description requirements are in practice.⁶² Courts have suggested that the enablement requirement is less demanding in terms of literal description, because what is not literally described may fall within the knowledge of a person skilled in the art.⁶³ Commentators have similarly suggested that enablement is simply a subset of the written description requirement.⁶⁴ Although

disclosed for a reference to be anticipatory"); *but see In re Bremner*, 186 F.2d 216 (C.C.P.A. 1950) (sustaining rejection for lack of disclosed utility).

⁶⁰ *Kingsdown Medical Consultants, Ltd. v. Hollister, Inc.*, 863 F.2d 867, 874 (Fed. Cir. 1988) (*en banc*) (holding that it is not "in any manner improper to amend or insert claims intended to cover a competitor's product the applicant's attorney has learned about during the prosecution").

⁶¹ *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997).

⁶² *Moba v. Diamond Automation*, 325 F.3d 1306, 1326 (Fed. Cir. 2003) (Rader, J., concurring) (arguing that "to enable is to show possession, and to show possession is to enable"); Robert P. Merges, *Software and Patent Scope*, 85 Tex. L. Rev. 1627, 1652 (2007) (commenting that "courts have not been especially helpful" in articulating how enablement differs from written description).

⁶³ *In re DiLeone*, 436 F.2d 1404, 1405 & n.1 (C.C.P.A. 1971) ("it is possible for a specification to enable the practice of an invention as broadly as it is claimed, and still not describe that invention," such as where "the specification discusses only compound A," which enables, but does not describe, obvious variant compounds B and C).

⁶⁴ See Janice M. Mueller, *The Evolving Application of the Written Description Requirement to Biotechnological Inventions*, 13 Berkeley Tech. L.J. 615, 633 (1998) ("application of the written description requirement to original application claims has created a new and undefined 'super-enablement' standard for biotechnological inventions").

there are cases where an invention is described but not enabled,⁶⁵ such cases are quite rare.⁶⁶

2. The limits of prior art.

The prior art in patent law is the sum of public knowledge⁶⁷ prior to the patentee's invention.⁶⁸ The intuition behind prohibiting claims covering the prior art is simple: if society already has the invention in the public domain, the patentee contributes nothing inventive and cannot claim what the world already knows.⁶⁹ Protection of the prior art is absolute: if a claim covers even a single prior art embodiment—even if the claim also covers many novel and innovative embodiments—the claim is invalid.⁷⁰

3. The process of claim amendment.

Claims are required to particularly point out what “the applicant regards as his invention.”⁷¹ At first blush, this suggests that claims should be defined by the patentee's own understanding of his invention. However, the legal scope of claiming is driven only by the specification's disclosure and the prior art, *not* by the patentee's own understanding of his invention. A patent applicant “is entitled to claims as broad as the prior art and his disclosure will allow.”⁷² In short:

Legal coverage = specification – prior art

⁶⁵ See, e.g., *In re Wands*, 858 F.2d 731 (Fed. Cir. 1988) (specification described a diagnostic test using an antibody, but did not teach how to make the antibody necessary for the test).

⁶⁶ *Lizardtech*, 424 F.3d at 1345 (enablement and written description “usually rise and fall together”).

⁶⁷ See note 37, *supra*.

⁶⁸ A patentee's date of invention is presumed to be when the patent application was filed, though it can be proven to be earlier. *Bates v. Coe*, 98 U.S. 31, 34 (1878).

⁶⁹ *Graham v. John Deere Co.*, 383 U.S. 1, 6 (1966) (“Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available.”); *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1746 (2007).

⁷⁰ *Peters v. Active Mfg. Co.*, 129 U.S. 530, 537 (1889) (“That which infringes, if later, would anticipate, if earlier.”).

⁷¹ 35 U.S.C. § 112 (2000).

⁷² *Gentry Gallery*, 134 F.3d at 1480.

Claim drafting is thus an objective, lawyer-driven process. Once a patent application is filed, the inventor's own view of the scope of his invention is basically irrelevant.⁷³

As noted previously, a patentee can file multiple original claims reflecting the invention at the time of filing.⁷⁴ The process of claim amendment, however, provides the patentee (more accurately, his lawyer) with several advantages over filing original claims.⁷⁵

First, repeated claim amendments consume PTO resources and "wear down" PTO examiners.⁷⁶ Each claim amendment requires the examiner to re-examine the claim, with a bias toward allowance. An erroneous allowance by the examiner results in an issued patent.⁷⁷ An erroneous rejection, by contrast, can continue to be contested.⁷⁸

More importantly, claim amendment occurs *after* the patentee knows of the examiner's "best" prior art.⁷⁹ This is akin to the examiner revealing his hand before the patentee places his bet in a card game. Even without examiner error, *ex post* claiming permits patentees to obtain the broadest coverage available for everything that is disclosed in the specification, minus the prior art *actually found* by the examiner. Instead of the patentee articulating what is "new" in his patent; *ex post* claiming permits the patentee's lawyer to *ex post* claim everything that the examiner's best prior art fails to prove is "not new." Given the enormous cost of searching for prior art and the lack of PTO resources to do so,⁸⁰ the practical difference in patent coverage resulting from

⁷³ See *Arlington Indus., Inc. v. Bridgeport Fittings, Inc.*, 345 F.3d 1318, 1330 (Fed. Cir. 2003) (inventor testimony "of little consequence" in determining claim scope).

⁷⁴ See text accompanying note 31–33, *supra*.

⁷⁵ But with one major disadvantage, in that narrowing claim amendments raise a presumption of prosecution history estoppel that prevents later use of the doctrine of equivalents. *Festo*, 535 U.S. at 740-41. Thus, there is some degree of mutual exclusion between the methods of *ex post* claiming.

⁷⁶ Lemley & Moore, *supra* at note 8, at 74-76.

⁷⁷ The issued patent can be challenged in litigation, but this requires clear and convincing evidence. *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360 (Fed. Cir. 1984).

⁷⁸ See Lemley & Moore, *supra* at note 8, at 75 ("Since an examiner can only finally dispose of an application by allowing it, an examiner faced with a determined applicant has every incentive to give in and allow the patent."). This is not quite a problem of *ex post* claiming but simply the non-mutuality of PTO proceedings.

⁷⁹ 37 C.F.R. § 1.104(c)(2) (2006) ("the examiner must cite the best references at his or her command").

⁸⁰ John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, 2001 U. Ill. L. Rev. 305, 316-22 (describing the

this allocation of proof is enormous. The sum of permitting unlimited claim amendment is a strong incentive for patentees to write overbroad claims that the patentee does not actually regard as inventive, and see if the examiner manages to catch the overbroad claim, with no downside as the patentee can simply amend the claims if they are rejected. This tactic wastes prosecution resources at best and, at worst, results in issuance of overbroad patents. Indeed, patent lawyers regard an immediate allowance of the patent, *i.e.* giving the patentee exactly what he regarded as inventive and avoiding waste of prosecution resources, as a sign of failure.⁸¹

C. Litigating

After one or more rounds of claim amendment in the patent office, the patent will eventually issue with a set of claims. The patent is now enforceable through infringement litigation, where the patentee accuses a competitor of infringing the issued claim.⁸²

The words of a claim in an issued patent generally cannot be changed in litigation.⁸³ However, the importance of a claim is not its words in the abstract: a claim is important only in determining what products fall within its scope and are thereby considered infringing.⁸⁴ Because language is usually imprecise, there is a dispute in virtually every patent case about whether the claims cover the accused product.⁸⁵ The process of resolving the scope of a patent is known as “claim construction” and is usually the most important part of patent litigation.⁸⁶

“patent quality crisis” caused by limited PTO resources). This is not to say that increased PTO resources is the answer, considering that most issued patents are harmless. See Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 Nw. U. L. Rev. 1495, 1510-11 (2001).

⁸¹ See Kinney & Lange, P.A., *Intellectual Property Law for Business Lawyers* § 3.4.3 (2003) (immediate allowance means the claims were drafted too narrowly).

⁸² 35 U.S.C. § 271 (defining infringement).

⁸³ The claims of an issued patent may be corrected for minor errors. 35 U.S.C. § 255 (2000). More importantly, they can be subjected to reissue proceedings. 35 U.S.C. § 251 (2000). Reissue proceedings are discussed in more detail in Part I.D.

⁸⁴ See *Safetecare Manufacturing, Inc. v. Tele-Made, Inc.*, No. 06-1535, slip op. at 9 (Fed. Cir. 2007) (holding that the meaning of a claim and its infringement should be determined in context of the accused device).

⁸⁵ See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1334 (Fed. Cir. 2005) (Mayer, J., dissenting) (noting that there are “few cases in which claim construction is not dispositive”).

⁸⁶ Lemley, *supra* at note 1, at 102 (“claim construction is so important to patent litigation that once the court construes the claims, most patent cases

1. Solving the riddle: the patentee's objective in litigation.

The patentee's objective in litigation is to construe a claim in a way that covers a specific identified product, but does not cover any identified prior art. Judge Giles Rich once described this "riddle" as, "the stronger a patent the weaker it is and the weaker a patent the stronger it is."⁸⁷ A broad patent claim that covers the accused product is also more likely to cover prior art and be invalid; a narrow claim construction that avoided the prior art is more likely not to be infringed.⁸⁸ To succeed in litigation, the patentee must identify *one* claim construction that covers the accused product, is described and enabled by the specification, and does not cover any identified prior art. This is "solving the riddle." An accused infringer correspondingly attempts to frustrate this by either suggesting a very narrow claim scope (to avoid infringement), or a very broad scope (that invalidates the patent). If the patentee can identify a favored claim construction and persuade the court to adopt it, it will usually prevail; if it cannot, it will usually lose.

2. Distorting patent scope in favor of the patentee.

Initially, one might imagine that the *ex post* claiming cannot occur once a patent reaches litigation. A patentee in litigation usually cannot change the words of his claim.⁸⁹ The process of claim construction is supposed to faithfully and accurately clarify, not change, the legal scope of the patent reflected in the issued claim.⁹⁰ Although both parties certainly attempt to manipulate a claim and its construction with concerns of the accused device and the prior art in

settle, and those that do not are often decided on summary judgment"); see *Safecare*, No. 06-1535, slip op. at 9 (Fed. Cir. Aug. 3, 2007) (holding that meaning of claim is determined in light of operation of the accused device); *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1326-27 (Fed. Cir. 2006) (same).

⁸⁷ Giles S. Rich, *The Proposed Patent Legislation: Some Comments*, 35 *Geo Wash. L. Rev.* 641, 644 (1967).

⁸⁸ *See id.*

⁸⁹ *Novo Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1357 (Fed. Cir. 2003) ("A district court can correct a patent only if (1) the correction is not subject to reasonable debate based on consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation of the claims.").

⁹⁰ *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1580 (Fed. Cir. 1991) ("The construction of claims is simply a way of elaborating the normally terse claim language.")

mind, there would initially appear no reason for the judge who ultimately decides the issue to dance to either side's tune.⁹¹

The problem is that claim analysis is not nearly as simple as appears at first blush. Several doctrines take infringement analysis away from a simple “most accurate meaning” approach.

The first doctrine is that a claim should be construed to preserve its validity.⁹² This includes construing a claim narrowly to avoid a newly discovered prior art reference never presented to the PTO.⁹³ For this doctrine to have any meaning, it necessarily means that the claim is construed more narrowly than it otherwise would have been, distorting claim scope solely due to *ex post* considerations of validity instead of the patentee's own awareness of his invention.⁹⁴ This is not different in effect than if the patentee had himself made an explicit *ex post* amendment disclaiming a feature to avoid newly discovered prior art.⁹⁵

The second doctrine is the updating of claim language over time. As Mark Lemley has shown, courts frequently assess the scope of a claim for infringement purposes at the time of infringement.⁹⁶ However, courts assesses the scope of a patent for enablement purposes at the

⁹¹ *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*) (“the words of a claim are generally given their ordinary and customary meaning” (internal quotation omitted)).

⁹² *Klein v. Russell*, 86 U.S. (19 Wall.) 433, 466 (1873).

⁹³ *Turrill v. Mich. S. R.R. Co.*, 68 U.S. (1 Wall.) 491, 510 (1864) (construing claim narrowly to avoid newly present prior art); *ACS Hospital Sys., Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577 (Fed. Cir. 1984) (construing claim narrowly to avoid obviousness invalidation).

⁹⁴ Some more recent cases narrowly construed this doctrine. *See, e.g., Nazomi Communications, Inc. v. ARM Holdings, PLC*, 403 F.3d 1364, 1368-69 (Fed. Cir. 2005) (cautioning against putting “the validity cart before the claim construction horse”).

⁹⁵ One difference is that by receiving the benefit of amendment in claim construction rather than explicit amendment in reissue or reexamination, the patentee does not face reduction in damages or intervening rights. *See* text accompanying note 303–306, *infra*.

⁹⁶ Lemley, *supra* at note 1, at 108-09 (“Whether an accused device infringes is tested as of the time of the alleged infringement; there are numerous cases in which devices first developed after the patent issues are nonetheless held to infringe the patent.”) (citing *Superguide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870 (Fed. Cir. 2004); *Laser Alignment, Inc. v. Woodruff & Sons, Inc.*, 491 F.2d 866 (7th Cir. 1974); *In re Hogan*, 559 F.2d 595, 606 (C.C.P.A. 1977); *Chiron Corp. v. Genentech, Inc.*, 266 F. Supp. 2d 1172 (E.D. Cal. 2002), *aff'd*, 363 F.3d 1247 (Fed. Cir. 2004)); *but see Plant Genetic Sys. v. DeKalb Genetics Corp.*, 315 F.3d 1335, 1345 (Fed. Cir. 2003) (“Claims are to be given their ordinary and objective meaning as of the time of the invention.”)).

time of filing,⁹⁷ and the scope of a patent for obviousness purposes at the time of invention (usually meaning conception).⁹⁸ The problem here is that the meaning of words change over time.⁹⁹ At the extreme, theoretically, the meaning of claim words could be narrow at the time of invention to exclude a prior art product, but broaden by the time of infringement to cover that same prior art product. Similarly, the patentees claim may be construed narrowly for enablement purposes, but broadly for infringement. Both results would contradict well-settled principles of patent law.¹⁰⁰ This contradiction in claim construction doctrine gives the patentee doctrinal support to maneuver around the prior art while asserting broad theories for infringement, *ex post*, in light of his tactical requirements in solving the riddle.¹⁰¹

The third doctrine is the clear and convincing evidence standard required to invalidate a patent,¹⁰² contrasted with the preponderance of evidence standard required to find infringement. This contrast means that an accused infringer who literally practices the prior art without modification can be held liable; because the jury can find that the device infringes by a preponderance of evidence, but the same device does not anticipate by the higher clear and convincing evidence standard.¹⁰³

The fourth doctrine is the doctrine of equivalents. “Under this doctrine, a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe”

⁹⁷ *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991); *In re Hogan*, 559 F.2d 595, 606 (C.C.P.A. 1977).

⁹⁸ 35 U.S.C. §§ 102, 103 (2000). The Federal Circuit sidestepped the exact timing for determining claim scope in *Phillips v. AWH Corp.*, holding that the time of invention is the time of filing. 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc*) (“the ordinary and customary meaning of a claim term is the meaning . . . at the time of the invention, i.e., as of the effective filing date of the patent application.”).

⁹⁹ Lemley, *supra* at note 1, at 103-04.

¹⁰⁰ *Peters v. Active Mfg. Co.*, 129 U.S. 530, 537 (1889) (“That which infringes, if later, would anticipate, if earlier.”); *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1378-79 (Fed. Cir. 2007) (“the disclosure must teach the full range of embodiments in order for the claims to be enabled”).

¹⁰¹ Lemley, *supra* at note 1, at 112 (“permitting the same claim term to mean different things invites gaming of the claim construction process”).

¹⁰² *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050 (Fed. Cir. 1988).

¹⁰³ *Tate Access Floors, Inc. v. Interface Architectural Resources, Inc.*, 279 F.3d 1357, 1367 (Fed. Cir. 2002) (accused infringer who literally practices the prior art has no non-infringement defense and must prove invalidity by heightened standard); *but see Peters*, 129 U.S. at 537.

if a jury deems the accused product to be “equivalent.”¹⁰⁴ Equivalence may be found if a jury deems the differences between the claim element and the accused product to be “insubstantial.”¹⁰⁵ The doctrine is therefore essentially a roving commission for juries to expand patent scope beyond what the claims actually say,¹⁰⁶ limited at some amorphous point when the judge decides that the expansion “vitiates” a claim limitation.¹⁰⁷ Furthermore, because equivalence is assessed at the time of infringement,¹⁰⁸ the doctrine permits the capture of later-arising technology that was neither disclosed nor enabled at the time of filing.¹⁰⁹

The doctrine of equivalents has been heavily criticized,¹¹⁰ because it is directly at war with the notice function of claims.¹¹¹ Issued patent

¹⁰⁴ *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997).

¹⁰⁵ *Id.* at 38-40.

¹⁰⁶ *See Wilson Sporting Goods Co. v. David Geoffrey & Assoc.*, 904 F.2d 677, 684 (Fed. Cir. 1990) (“the scope of patent protection *as defined by the claims* [] remain[s] the same and application of the doctrine *expands the right to exclude* to ‘equivalents’ of what is claimed” (emphasis in original)).

¹⁰⁷ *Warner-Jenkinson*, 520 U.S. at 39 n. 8 (“if a theory of equivalence would entirely vitiate a particular claim element, partial or complete judgment should be rendered by the court, as there would be no further *material* issue for the jury to resolve” (emphasis in original)). If a claim element had already been amended previously, the doctrine of equivalents may also be foreclosed by prosecution history estoppel. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 735-38 (2002) (“Estoppel arises when an amendment is made to secure the patent and the amendment narrows the patent’s scope.”).

¹⁰⁸ *Warner-Jenkinson*, 520 U.S. at 37 (“the proper time for evaluating equivalency—and thus knowledge of interchangeability between elements—is at the time of infringement”).

¹⁰⁹ Joshua D. Sarnoff, *Abolishing the Doctrine of Equivalents and Claiming the Future After Festo*, 19 Berkeley Tech. L.J. 1157, 1168-69 (2004) (“This extended coverage defies the basic premises of patent law that inventions should receive protection only when disclosed.”). Indeed, because the doctrine of equivalents *cannot* be applied to an embodiment that was literally disclosed but not literally claimed, it creates the perverse result that it necessarily broadens patent scope beyond the specification’s disclosure. *See Johnson & Johnston Assocs. Inc. v. R.E. Serv. Co.*, 285 F.3d 1046, 1054 (Fed. Cir. 2002) (*en banc*) (doctrine of equivalents cannot cover literally disclosed embodiment).

¹¹⁰ *See, e.g.*, Sarnoff, *supra* at note 109, at 1210-11 (advocating wholesale abolition of the doctrine); Meurer & Nard, *supra* at note 11, at 1987-91. (advocating greater claim refinement and narrower scope for the doctrine of equivalents).

¹¹¹ Martin J. Adelman & Gary L. Francione, *The Doctrine of Equivalents in Patent Law: Questions that Pennwalt Did Not Answer*, 137 U. Pa. L. Rev. 673,

claims are supposed to be boundaries which competitors can design around, much as people can walk near their neighbor's fence without trespassing.¹¹² It would be highly problematic for everyday life if every fence encompassing real property exuded a nebulous penumbra around itself, which neighbors would not be able to see yet must take care not to enter. The doctrine of equivalents, however, establishes precisely such a penumbra around patents.¹¹³ Moreover, its effect in avoiding is functionally no different from an explicit claim amendment, *made at the time of infringement*, to create a claim just broad enough to cover the accused product while avoiding the prior art.¹¹⁴ The patentee will automatically receive a hypothetical claim that "solves the riddle" of patent litigation if there is any possible way to do so.¹¹⁵

D. Reclaiming

Although the doctrine of equivalents gives the patentee the perfect hypothetical claim, it cannot expand the patent monopoly without limit. Courts will at some point invoke the claims,¹¹⁶ the specification,¹¹⁷ or the prosecution history to bar an equivalency argument.¹¹⁸ For these and other reasons, even the generosity of the doctrine of equivalents

715 (1989) ("any use of the doctrine of equivalents conflicts with the notion that the claims define the scope of patent protection").

¹¹² See, e.g., *State Indus. v. A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985) ("One of the benefits of a patent system is its so-called 'negative incentive' to 'design around' a competitor's products, even when they are patented, thus bringing a steady flow of innovations to the marketplace.").

¹¹³ See Adelman & Francione, *supra* at note 111, at 683 ("pervasive and systemic uncertainty generated by the doctrine of equivalents destroys the ability of patent claims to provide fair notice, so that they effectively provide no notice").

¹¹⁴ See *Wilson*, 904 F.2d at 684 (positing a hypothetical claim that is just broad enough to cover the accused product but avoid prior art); John R. Thomas, *Claim Re-Construction: The Doctrine of Equivalents in the Post-Markman Era*, 9 Lewis & Clark L. Rev. 153, 169-73 (2005) (suggesting that courts could modify the doctrine of equivalents into a "judicial reissue" of the patent at the time of litigation).

¹¹⁵ See Raj S. Dave, *A Mathematical Approach to Claim Elements and the Doctrine of Equivalents*, 16 Harv. J.L. & Tech. 507, 554 (2003) ("a hypothetical claim is drafted based on broadening the literal language of the actual claim just enough such that the hypothetical claim would be literally infringed by the accused activity").

¹¹⁶ *Warner-Jenkinson*, 520 U.S. at 39 n. 8 (claim vitiation).

¹¹⁷ *Johnson & Johnston*, 285 F.3d at 1054 (specification dedication).

¹¹⁸ *Festo*, 535 U.S. at 735-38 (prosecution history estoppel).

and claim construction doctrine often leave patentees wanting in litigation.¹¹⁹

It is at these times that patentees seek to return to the patent office. There are three avenues for doing so: reissue, reexamination, and continuation applications.

1. Reissue and reexamination.

Reissue proceedings were initially a non-statutory creation. Although the 1790 and 1793 Patent Acts did not have reissue provisions, the Secretary of State permitted patentees to surrender patents that were considered “defective” and obtain a corrected patent.¹²⁰ The Supreme Court endorsed this practice in *Grant v. Raymond*.¹²¹ The rationale given was explicitly policy driven,¹²² and the Court was greatly moved by the concern that holding patentees to their mistakes would reduce patent incentives:

[A patent] is the reward stipulated for the advantages derived by the public for the exertions of the individual, and is intended as a stimulus to those exertions. . . . That sense of justice and of right which all feel, pleads strongly against depriving the inventor of the compensation thus solemnly promised, because he has committed an inadvertent or innocent mistake.¹²³

Correspondingly, the Court brushed aside the concerns of competitors who might rely on the defective patent. In the Court’s view, those competitors who examined patents in search of unclaimed subject-matter were akin to pirates:

An objection much relied on is, that after the invention has been brought into general use, those . . . perceiving the variance between the specification and the machine, and availing themselves of it, may have constructed, sold and used the machine without infringing the legal rights of the patentee, or incurring the penalties of the law. The

¹¹⁹ John R. Allison & Mark A. Lemley, *The (Unnoticed) Demise of the Doctrine of Equivalents*, 59 Stan. L. Rev. 955, 966 (2007) (patentees win 58% of all trials and 24% of doctrine of equivalents cases).

¹²⁰ *Grant v. Raymond*, 31 U.S. (6 Pet.) 218, 239 (1832) (“a former patent had been issued in August 1821, to the same person for the same improvement, ‘which had been cancelled, owing to the defective specification on which the same was granted’”).

¹²¹ *Id.* at 244.

¹²² *See id.* at 241 (“If the new patent can be sustained, it must be on the general spirit and object of the law, not on its letter.”).

¹²³ *Id.* at 241-42.

new patent would retro-act on them, and expose them to penalties to which they were not liable when the act was committed.

This objection is more formidable in appearance than in reality. It is not probable that the defect in the specification can be so apparent as to be perceived by any but those who examine it for the purpose of pirating the invention. They are not entitled to much favour.¹²⁴

The reissue practice was codified into statute the same year.¹²⁵ The statute has been amended several times, and in its modern form has four requirements: (1) the original unexpired patent must be surrendered; (2) the patent owner must establish the original error arose “without deceptive intention”; (3) the amendments in reissue must meet the standards of patentability, including the written description requirement; and (4) a reissue application to broaden the claims must be filed within 2 years of the original patent issuance.¹²⁶

The primary downside of reissue proceedings for a patentee is the accrual of intervening rights, that is, rights accruing to infringers due to activities between the time of original patent issuance and re-issuance. Intervening rights accrue on any claim that was substantively changed during reissue.¹²⁷ The scope of intervening rights come in two varieties: absolute and equitable.

Absolute intervening rights apply to devices made or purchased during the period of intervening rights (i.e. before the date of re-issuance).¹²⁸ Not only are these devices not subject to infringement

¹²⁴ *Id.* at 243 (emphasis added). The Court left open the question of whether there would be a defense of intervening rights to continue using a machine. *Id.* at 244 (“That question is not before the court The defence when true in fact may be sufficient in law, notwithstanding the validity of the new patent.”).

¹²⁵ Act of July 3, 1832, ch. 162, § 3, 4 Stat. 559 (“it shall be lawful for the Secretary of State, upon the surrender to him of such patent, to cause a new patent to be granted to the said inventor for the same invention for the residue of the period”).

¹²⁶ 35 U.S.C. § 251 (2000).

¹²⁷ 35 U.S.C. § 252 (2000); *Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 810 F.2d 1113, 1116 (Fed. Cir. 1987) (“‘identical’ within the meaning of § 252 first paragraph, means ‘without substantive change’”).

¹²⁸ See *Shockley v. Arcan, Inc.*, 248 F.3d 1349, 1360 (Fed. Cir. 2001) (absolute intervening rights does not attach to articles offered for sale but not manufactured before re-issuance date).

damages, the accused infringer receives a personal right to continue using these devices.¹²⁹

Absolute intervening rights apply only to the specific devices that are made or sold.¹³⁰ It does not provide the a manufacturer with the right to keep making additional infringing devices, or a seller to keep selling his inventory, even though this may be necessary for the manufacturer or seller to recover his fixed costs, such as advertising. The statute provides for a determination of “equitable” intervening rights in such cases, where courts have discretionary authority to permit accused infringers to make and sell additional infringing devices.¹³¹ Courts have been reluctant to grant such equitable intervening rights.¹³²

The reexamination process is very similar to the reissue process.¹³³ The primary difference is that any person can request reexamination,¹³⁴ but must raise a “substantial new question of patentability” based on written prior art.¹³⁵ Reexamination can only

¹²⁹ *BIC Leisure*, 1 F.3d at 1221 (discussing absolute nature of right).

¹³⁰ *Cohen v. United States*, 487 F.2d 525, 528 (Ct. Cl. 1973) (“The doctrine of intervening rights, as set forth in 35 U.S.C. § 252, is limited to the ‘specific thing’ purchased or used prior to grant of the reissue patent.”).

¹³¹ 35 U.S.C. § 252.

¹³² See, e.g., *White v. Fafnir Bearing Co.*, 263 F. Supp. 788, 811-12 (D. Conn. 1966), *aff’d*, 389 F.2d 750 (2d Cir. 1968) (\$70,000 investment in research and development—real money in 1960—did not justify continued infringement); *Plastic Container Corp. v. Continental Plastics, Inc.*, 607 F.2d 885, 902-03 (10th Cir. 1979) (no right to continue infringement when infringer had already made substantial profits); *Halliburton Co. v. Western Co.*, 10 USPQ2d 1973, 1983 (W.D. Okla. 1989), *aff’d*, 883 F.2d 1027 (Fed. Cir. 1989) (no right to continue infringement when investment prior to original patent issuance); *Shockley v. Arcan, Inc.*, 248 F.3d 1349, 1361 (Fed. Cir. 2001) (no right to continue infringement because infringer was willfully infringing reissued patent); cf. *Seattle Box Co. v. Indus. Crating & Packing, Inc.*, 756 F.2d 1574, 1581 (Fed. Cir. 1985) (permitting infringer to dispose of existing inventory, but nothing more).

¹³³ I am primarily referring to *ex parte* reexaminations. There is a separate *inter partes* reexamination process where a third party may challenge the patent in an adversarial proceeding. 35 U.S.C. § 311 (2000). My discussion of the *inter partes* reexamination procedure is limited because the procedure is very rarely used. See Federal Trade Commission, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*, ch. 5, p. 16 (2003) (noting that only 4 *inter partes* reexaminations had occurred as of the time of the hearing).

¹³⁴ 35 U.S.C. § 302 (2000).

¹³⁵ 35 U.S.C. § 303 (2000).

narrow the patent,¹³⁶ whereas a reissue application filed within 2 years can broaden the patent. For present purposes, reexamination and reissue are otherwise not different. Importantly, the intervening rights attaching to amended claims in reexamination are identical to amended claims in reissue proceedings.¹³⁷

2. Continuation applications

Continuations¹³⁸ have existed since 1864,¹³⁹ but their usefulness as a prosecution tactic is best illustrated by the 1938 decision in *Crown Cork & Seal Co. v. Ferdinand Gutmann Co.*¹⁴⁰ In *Crown Cork*, the patentee Warth filed an initial application on a process for making bottle caps, the insight being the simultaneous use of heat and pressure to seal the cap.¹⁴¹ Warth also disclosed in his original application that it may be desirable to “preheat” the assembled crown, but did not claim this feature.¹⁴² A patent issued on the original application in 1931.¹⁴³ In 1929 a competitor, Johnson, filed a patent application directed to preheating, which was issued in 1932.¹⁴⁴ Upon seeing the Johnson patent, Warth then added claims covering

¹³⁶ 35 U.S.C. § 305 (2000) (“No proposed amended or new claim enlarging the scope of a claim of the patent will be permitted in a reexamination proceeding.”).

¹³⁷ 35 U.S.C. § 307(b) (2000) (“Any proposed amended or new claim determined to be patentable and incorporated into a patent following a reexamination proceeding will have the same effect as that specified in section 252 of this title for reissued patents.”).

¹³⁸ “Continuations” refer to both a family of procedural devices in the PTO and a specific member of that family. A “continuation application” under 35 U.S.C. § 120 and 37 C.F.R. § 1.78 refers to a separate application that claims priority to the originally filed application. A “continuation-in-part” application is similar to a continuation application, but adds new material (and has a divided priority date, depending on whether the added materials is implicated in a particular claim). A “request for continued examination” is authorized by 35 U.S.C. § 132 and permits continued prosecution of the same application, effectively undoing a final action (whether rejection or allowance). These are often collectively referred to as “continuations” because “their policy effects are indistinguishable.” Lemley & Moore, *supra* at note 8, at 64 n.2.

¹³⁹ *Godfrey v. Eames*, 68 U.S. (1 Wall.) 317, 326 (1864) (holding that a later filed application for the same invention should be considered “one continuous application”).

¹⁴⁰ 304 U.S. 159 (1938).

¹⁴¹ *Id.* at 162.

¹⁴² *Id.* at 163.

¹⁴³ *Id.* at 161.

¹⁴⁴ *Id.*

preheating to his continuation application.¹⁴⁵ In the ensuing contest for the invention, the court of appeals awarded priority to competitor Johnson because, “had it not been for this competitor, Warth might never have considered the subject [of preheating] worth claiming as an invention.”¹⁴⁶

The Supreme Court reversed and awarded the preheating invention to Warth. It held that “Warth’s disclosure was continuously before the patent office The continuity so maintained shows that Warth intended to retain, not to abandon, the disclosed invention,” even though Warth never bothered to claim preheating until a competitor came along.¹⁴⁷

Crown Cork stands for three propositions. First, a continuation applicant may *claim*, for the first time in the continuation, anything that was *disclosed* in the original application. Second, a continuation applicant may be spurred into making a claim over something he previously disclosed by thought of as insignificant, solely because *a competitor later* places significance on that feature. Third, a continuation applicant may obtain this broadened protection in a continuation application *without surrendering* his original issued patent. All remain features of modern continuation practice.¹⁴⁸

The liberal continuation rules led to widespread abuse, which was documented by Mark Lemley and (now Judge) Kimberly Moore in a 2004 article.¹⁴⁹ The abuses include: (1) multiple continuations delay issuance of patents, causing uncertainty for competitors; (2) multiple continuations also wear down examiners, consume PTO resources, and increase the likelihood of examiner error; and (3) changing claims *ex post* allow patentees to retroactively ensnare competitors, reducing the incentive for subsequent innovation.¹⁵⁰ Lemley and Moore also noted two previously prevalent abuses which were curbed significantly (though not completely eliminated) by a 1994 change in the patent statute: (1) submarine patents, where the patentee would keep a patent application secret for *decades*, before springing the patent on a mature industry;¹⁵¹ and (2) “evergreening,” where multiple continuations covering the same invention would issue as multiple

¹⁴⁵ *Id.* This is a common tactic to provoke an “interference,” where the PTO determines who has priority to a particular invention. See 35 U.S.C. § 135 (2000) (interferences).

¹⁴⁶ *Id.* at 164.

¹⁴⁷ *Id.* at 165.

¹⁴⁸ See 35 U.S.C. § 120 (2000) (requirements of a continuation).

¹⁴⁹ Lemley & Moore, *supra* at note 8, at 71-81.

¹⁵⁰ *Id.* at 71-79.

¹⁵¹ *Id.* at 79-80.

patents, each with a 17 year term from issuance, thus extending the effective period of monopoly.¹⁵² Because the 1994 statute changed the term to 20 years from the filing of the *original* patent application,¹⁵³ a patentee's period of exclusion is now almost always limited by this 20-year deadline.¹⁵⁴

Lemley and Moore proposed several reforms, including the possibility of eliminating continuations altogether.¹⁵⁵ However, they would have preserved reissue proceedings to permit patentees to correct their mistakes.¹⁵⁶

In response to the Lemley and Moore article, the PTO attempted to enact new limitations on continuations.¹⁵⁷ Under the PTO's attempted rule changes, a patent application family (i.e. the original application and its continuations) would have been limited to two continuation applications and one request for continued examination as of right; with a petition showing good cause for further continuation applications.¹⁵⁸ The exhaustion of continuation applications would not have prevented the applicant from filing a new patent application—he is only denied section 102(b) and (d) priority to his earlier filing date.¹⁵⁹

¹⁵² *Id.* at 81.

¹⁵³ 35 U.S.C. § 154(a)(2) (2000) (“a term . . . ending 20 years from the date . . . on which the earliest such application was filed”).

¹⁵⁴ See generally David L. Marcus, *Is the Submarine Patent Torpedoed? Ford Motor Co. v. Lemelson and the Revival of Continuation Application Laches*, 70 Temp. L. Rev. 521, 525 (1997) (describing submarine patent abuse prior to the 1994 change, and noting “even under the twenty year patent term many inventors will still be able to prolong the prosecution of their patent applications long enough for industries to become dependent on the technologies employing their inventions”).

¹⁵⁵ Lemley & Moore, *supra* at note 8, at 93-104.

¹⁵⁶ *Id.* at 77-78 (“a patentee dissatisfied with her claims can rewrite those claims in a reissue proceeding”).

¹⁵⁷ The rules are controversial, and their impact remains to be seen. See Laxman Sahasrabuddhe, Note, *Is the PTO Authorized to Promulgate the Proposed Rule Change to the Continuation Practice?*, 22 Berkeley Tech. L.J. 193, 211-13 (2007) (arguing that the rules are invalid).

¹⁵⁸ Patent and Trademark Office, *Changes To Practice for Continued Examination Filings*, 72 Fed. Reg. 46716, 46837-41 (Aug. 21, 2007) (amending 37 C.F.R. §§ 1.78(d)(vi) (continuations) and 1.114(g) (requests for continued examination)).

¹⁵⁹ Unless a 35 U.S.C. § 102(b) bar results from intervening publication of the invention (including by publication of the original application) the denial of priority should not have an effect absent foreign filing. *Cf.* 35 U.S.C. § 102(d) (rejection if the applicant has filed foreign applications more than one year earlier). Because the United States has a first-to-invent system, even

The PTO's attempted rules were quickly enjoined by a district court.¹⁶⁰ It is therefore likely that unlimited continuations—with their traditional abuses—will remain part of the patent system for the foreseeable future.

3. Comparing continuations and reissue proceedings

Although the two practices have very different origins, continuations and reissue produce very similar results.¹⁶¹ Both allow patentees, *ex post*, to claim whatever is disclosed in the specification. The articulated policy justifications for reissue and continuations are essentially the same: to prevent patentees from suffering reduced patent scope simply due to inadvertent mistake.¹⁶²

From this set of common effects and justifications, however, reissue proceedings are clearly more limiting on the patentee. A reissue proceeding cannot broaden claims after two years. Moreover, any claims changed during reissue are subject to intervening rights. By contrast, a continuation application can broaden claims indefinitely;¹⁶³ and is not subject to intervening rights—an infringing machine manufactured before the continuation can no longer be used after the continuation patent issues.¹⁶⁴ The only limit on continuations that is

with a late filing date the first inventor will still prevail in an interference proceeding under 35 U.S.C. § 102(g), at least in theory.

¹⁶⁰ *Tafas v. Dudas*, 2008 U.S. Dist. LEXIS 26086 (E.D. Va. 2008); *see also In re Henriksen*, 399 F.2d 253 (C.C.P.A. 1968) (PTO may not arbitrarily limit the number of continuation applications).

¹⁶¹ *See Johnson & Johnston Assocs. Inc. v. R.E. Serv. Co.*, 285 F.3d 1046, 1055 (Fed. Cir. 2002) (*en banc*) (discussing both reissues and continuations as options to reclaim surrendered subject-matter); Lichtman, *supra* at note 15, at 2013-14 (discussing the substitutability of the doctrine of equivalents, continuations and reissue proceedings).

¹⁶² Compare Stephen T. Schreiner & Patrick A. Doody, *Patent Continuation Applications: How the PTO's Proposed New Rules Undermine an Important Part of the U.S. Patent System with Hundreds of Years of History*, 88 J. Pat. & Trademark Off. Soc'y 556, 560 (2006) (“The inadvertent omission or unnecessary inclusion of a single word in a patent claim in a patent can allow a competitor to usurp the essence of the invention without infringing the patent claims. Continuations are needed to allow the inventor to secure adequate protection for the invention.”) with *Grant*, 31 U.S. at 384 (justifying reissue because “[t]hat sense of justice and of right which all feel, pleads strongly against depriving the inventor of the compensation thus solemnly promised, because he has committed an inadvertent or innocent mistake”).

¹⁶³ *Johnson & Johnston*, 285 F.3d at 1055.

¹⁶⁴ *Ricoh Co. v. Nashua Corp.*, 1999 U.S. App. LEXIS 2672, *9 (Fed. Cir. 1999); *see also Tex. Instruments, Inc. v. USITC*, 871 F.2d 1054, 1065 (Fed. Cir. 1989) (endorsing exclusion of competitor product by a continuation patent). Except under very rare circumstances, however, a continuation patent

not applicable to reissues is that the continuation application must be filed while an earlier application (whether the original or an earlier continuation) remains pending in the patent office,¹⁶⁵ whereas a reissue can be sought at any time prior to expiration.¹⁶⁶

There appears no good reason for the divergence, especially in the lack of intervening rights for continuations.¹⁶⁷ Intervening rights was a judicially created doctrine for reissue patents,¹⁶⁸ explicitly based on the “injustice” of a patentee “enlarg[ing] claims . . . with knowledge of the accused machine and definite purpose to include it.”¹⁶⁹ This injustice is no different with continuations; yet the Federal Circuit has not only declined to create a doctrine of intervening rights for continuations, it has issued ringing endorsements of the precise practice of enlarging claims in continuations “with knowledge of the accused machine and definite purpose to include it.”¹⁷⁰

E. Summary

It is patent law dogma that “the claims of a patent define the invention to which the patentee is entitled the right to exclude.”¹⁷¹ In this respect, claims are frequently likened to real property deeds.¹⁷²

In reality, however, this statement is true only in the most formalistic sense. Claims *today* define the right to exclude *today*; but they can be easily changed so that a competitor will be excluded tomorrow from what is not claimed today. In the long run, a patentee can claim anything that is supported by the specification and not rendered obvious by the prior art:

Potential Coverage = Specification – Prior Art

accrues no damages until its issuance. See 35 U.S.C. § 154 (2000) (term of patent begins at issuance).

¹⁶⁵ 35 U.S.C. § 120 (2000).

¹⁶⁶ 35 U.S.C. § 251 (2000).

¹⁶⁷ See Lemley & Moore, *supra* at note 8, at 109-111 (advocating creation of intervening rights in continuations based on reissue doctrine).

¹⁶⁸ *Sontag Chain Stores Co. v. Nat'l Nut Co.*, 310 U.S. 281 (1940).

¹⁶⁹ *Id.* at 293-94.

¹⁷⁰ *Kingsdown Medical Consultants, Ltd. v. Hollister, Inc.*, 863 F.2d 867, 874 (Fed. Cir. 1988) (*en banc*); *Tex. Instruments*, 871 F.2d at 1065. For more detail on why this “injustice” is not only unfair but has adverse economic policy implications, see Part II.A, *infra*.

¹⁷¹ *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*) (describing this as a “bedrock principle”).

¹⁷² See, e.g., *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 510 (1917); *Gen. Foods Corp. v. Studiengesellschaft Kohle mbh*, 972 F.2d 1272, 1274 (Fed. Cir. 1992).

The fact that he cannot be excluded today—but will be excluded tomorrow—is surely cold comfort to a competitor who is about to invest many millions of dollars launching a new product. Instead, a competitor has comfort only if a patentee is permanently precluded from excluding a certain activity—if the patentee *cannot* claim it. Effectively, this requires the activity to be not described, not enabled, or covered by the prior art. Thus, in direct contradiction to conventional wisdom, in the long run it is the specification and the prior art that really defines the right to exclude in a meaningful way. The next Part discusses the problems of this regime.

II. THE ECONOMICS OF *EX POST* CLAIMING

When considering the economics of *ex post* claiming, one could very well ask why *shouldn't* patentees have a property right in everything they were the first to describe? Indeed, the Federal Circuit has strongly endorsed the right of patentees to capture anything they had described in their specification but failed to originally claim. In *Kingsdown Medical Consultants, Ltd. v. Hollister, Inc.*,¹⁷³ the *en banc* court held:

[T]here is nothing improper, illegal or inequitable in filing a patent application for the purpose of obtaining a right to exclude a known competitor's product from the market; nor is it in any manner improper to amend or insert claims intended to cover a competitor's product the applicant's attorney has learned about during the prosecution of a patent application. Any such amendment or insertion must comply with all statutes and regulations, of course, but, if it does, its genesis in the marketplace is simply irrelevant.¹⁷⁴

More recently, the *en banc* Federal Circuit, in *Johnson & Johnston Associates, Inc. v. R.E. Service, Co.*,¹⁷⁵ held that “when a patent drafter discloses but declines to claim subject matter . . . , this action dedicates that unclaimed subject matter to the public.”¹⁷⁶ But the Court then re-endorsed the right of patentees to remove this “dedicated” public property from the public domain *at any time* through a continuation:

Within two years from the grant of the original patent, a patentee may file a reissue application and attempt to enlarge the scope of the original claims to include the disclosed but previously unclaimed subject matter. 35

¹⁷³ 863 F.2d 867 (Fed. Cir. 1988) (*en banc*).

¹⁷⁴ *Id.* at 874.

¹⁷⁵ 285 F.3d 1046 (Fed. Cir. 2002) (*en banc*).

¹⁷⁶ *Id.* at 1054.

U.S.C. § 251 (2000). In addition, a patentee can file a separate application claiming the disclosed subject matter under 35 U.S.C. § 120 (2000).¹⁷⁷

A good counter-example to the Federal Circuit's ringing endorsement of *ex post* claiming is the Supreme Court's decision in *Miller v. Brass Co.*¹⁷⁸ In *Miller*, the patentee initially claimed a lamp with two domes that permitted air to enter between them, and which could operate without a chimney.¹⁷⁹ The Court described what happened next:

The invention proved a failure, but it was found that the use of one of the domes (and the other parts), with the restoration of the chimney, would be a real improvement, and both the complainant and the defendant made such lamps in large quantities. Fifteen years after the original patent was granted, the patentee (or rather his assignee) discovers that the improved lamp was really a part of his original invention, and that by inadvertence and mistake he had omitted to claim it.¹⁸⁰

The patent office permitted the patentee to *ex post* claim the single-dome embodiment through a reissue; the Supreme Court struck the reissued patent down, reasoning that the patentee was simply trying to obtain a windfall:

It is manifest . . . that the suggestion of inadvertence and mistake in the specification was a mere pretense The only mistake suggested is that the claim was not as broad as it might have been.¹⁸¹

The Court also noted another problem with permitting retroactive broadening of the patent right, when competitors had relied on the old patent for fifteen years:

Patents have been so expanded and idealized, years after their first issue, that hundreds and thousands of mechanics and manufactures, who had just reason to suppose that the field of action was open, have been obliged to discontinue their employments, or to pay an enormous tax for continuing them.¹⁸²

¹⁷⁷ *Id.* at 1055.

¹⁷⁸ 104 U.S. 350 (1881).

¹⁷⁹ *Id.* at 350-51.

¹⁸⁰ *Id.* at 351.

¹⁸¹ *Id.*

¹⁸² *Id.* at 355

Miller aptly demonstrates the patentee's incentives in *ex post* claiming. *Ex post* claiming is rarely necessary to claim what the patentee actually had in mind as his invention when filing, because a patent applicant is entitled to file multiple claims at the time of his original application, claiming each and every aspect of his invention that he regards as inventive.¹⁸³ Instead, a patentee's resort to *ex post* claiming usually reflects the discovery of new information.¹⁸⁴ One common manifestation, as was the case in *Miller* as well as *Crown Cork*,¹⁸⁵ is the original invention proving a commercial failure, and a somewhat different incarnation proving to be successful when pioneered by a competitor. Whether through rationalized self-delusion or simple opportunism, the patentee then claims that the successful incarnation had been his invention all along.¹⁸⁶

This is not to deny, of course, that genuine claim drafting mistakes in describing the original invention, as opposed to opportunistic capturing of later insights, also occur and represent another reason advanced to justify *ex post* claiming. Holding the patentee strictly liable for all mistakes would harm patentee incentives and provide perverse incentives for accused infringers to nitpick on inconsequential errors.¹⁸⁷ Caution against over-deterrence of inconsequential mistakes is especially appropriate because, while some mistakes can be avoided by cost-effective counter-measures (such as more proof-reading), not all mistakes can be avoided at reasonable cost.¹⁸⁸

¹⁸³ See text accompanying notes 31–32.

¹⁸⁴ *Merges, supra* at note 62, at 1653 (“the original application, by failing to claim initially the technology later claimed in an amendment, signals that these embodiments are not particularly important or even relevant to the inventor”).

¹⁸⁵ See text accompanying notes 141–146.

¹⁸⁶ *In re Wilder*, 736 F.2d 1516, 1518 (Fed. Cir. 1984) (inventor's own declaration stating: “the true scope of the invention disclosed in the patent was not fully appreciated by us or by our attorney . . . until the commercial success of the ‘Thought Master’ record/playback device”).

¹⁸⁷ One good example of an obvious drafting error is *Lemelson v. General Mills, Inc.*, 968 F.2d 1202 (Fed. Cir. 1992). In that case, the patentee claimed a “trackway” instead of a “toy trackway,” even though the entire specification was directed to a toy. *Id.* at 1203 & n.3. The Federal Circuit permitted the claim to be corrected because it was obvious what the error was, and it could induce no reliance by any reasonable reader.

¹⁸⁸ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731 (2002) (“the nature of language makes it impossible to capture the essence of a thing in a patent application”); see *Lichtman, supra* at note 15, at 2016-18 (detailing the difficulties of writing “appropriate literal language early in the inventive process”).

But even when the patentee is only remedying a mistake in articulating his own insights, *ex post* claiming causes detrimental competitor reliance. Claim drafting mistakes causes losses, namely the loss of monopoly profits and the incentives for innovation such profits provide. These losses have to be borne by *someone*, either by the patentee forfeiting the monopoly or the competitor paying damages. To permit *ex post* claiming at the patentee's will, as current doctrine does through unlimited continuations, is to implicitly impose massive loss-shifting to competitors.

A. Capturing Later Information

The first problem with *ex post* claiming is that, coupled with a weak written description requirement, it permits patentees to redefine their inventions to cover what they had not originally invented in any meaningful sense. This occurs either by broadening the claim to cover a new invention, or by shifting the claim to emphasize previously-ignored features to avoid prior art. In all areas of intellectual property, addition to the monopoly beyond what was initially expected by the creator, *after* the creator's investment is sunk, is extremely inefficient.¹⁸⁹

Under the current written description requirement, inventing something is writing it down in the specification; without needing to know that it will work or will become commercially viable.¹⁹⁰ Articulating hypotheses are a vital part of the research process, but hypotheses do not themselves bring an invention to a socially useful fruition.¹⁹¹ Competitors who test the hypothesis and bring a product to

¹⁸⁹ See *Graham v. John Deere Co.*, 383 U.S. 1, 5-6 (1966) (“Congress in the exercise of the patent power may not . . . enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby.”); cf. *Eldred v. Ashcroft*, 537 U.S. 186, 211-15 (2003) (retroactive extension of copyright after author's investment is sunk); see also Lawrence B. Solum, *Congress's Power to Promote the Progress of Science: Eldred v. Ashcroft*, 36 Loy. L.A. L. Rev. 1, 66-74 (2002) (criticizing *Eldred*).

¹⁹⁰ *Snitzer v. Etzel*, 465 F.2d 899, 902 (C.C.P.A. 1972) (“literal description of a species provides the requisite legal foundation for claiming that species”). In *Snitzer*, the applicant described a formulation that resulted in 87 billion different combinations, which he eventually claimed a single one. *Id.* at 903. As one commentator noted, these 87 billion combinations could have been easily calculated by a computer. Charles L. Gholz, *Recent Developments in the CCPA Relating to the First Paragraph of 35 USC 112*, 54 J. Pat. Office Soc'y 768, 787-88 (1972) (“With the present capability of business machines, it is relatively simple to go from a structural formula reading on thousands of chemical compounds to a printout naming the compounds individually.”).

¹⁹¹ F.M. Scherer, *The Economic Effects of Compulsory Patent Licensing* 7-8 (1977) (noting the need to reward “recognition of market needs; the

the market create new *insights* in that process, insights that were not known to the patentee at the time of filing.¹⁹² Permitting *ex post* claiming encourages the speculative enumeration of hypotheses,¹⁹³ while punishing those who do the actual (costly) testing.¹⁹⁴ Dissenting in *Crown Cork*, Justice Black articulated this precise concern:

those familiar with a given field of industry may now insert speculative conjectures as disclosures in various applications and permit them to lie dormant until a competitor reduces speculation to practicality. Then, by the device of a "divisional," or if need be, as here, by "divisional" on "divisional," such a competitor can be pursued with infringement suits and harassed into surrendering his business to an ingeniously dilatory applicant.¹⁹⁵

Intuitively, allowing patent owners to obtain exclusive rights to later insights that they did not invent—and excluding the competitors that *did* invent those insights—would seem undesirable.¹⁹⁶ Robert Merges aptly calls this a “misappropriation by amendment.”¹⁹⁷ But this intuition warrants more exploration. Patents are designed to create incentives for innovation;¹⁹⁸ and the correct scope of a patent

organization of systematic product or process improvement, testing, production, and marketing efforts; the raising of essential capital; and assumption of the responsibility for deciding to go forward”).

¹⁹² No case better demonstrates this than *In re Wilder*, 736 F.2d 1516 (Fed. Cir. 1984), where the inventor stated in a declaration that he had not “appreciated” the scope of his *own* invention until it was discovered that a disclosed (but unclaimed) feature was the basis of marketplace demand for the commercial embodiment. *Id.* at 1518.

¹⁹³ See Note, *The Disclosure Function of the Patent System (Or Lack Thereof)*, 118 Harv. L. Rev. 2007, 2025-26 (2005) (noting incentives to create opaque disclosures with many insignificant variations).

¹⁹⁴ See R. Polk Wagner, *Information Wants to Be Free: Intellectual Property and the Mythologies of Control*, 103 Colum. L. Rev. 995, 1003-10 (2003) (describing types of later insights that can be fully or partially appropriated, and also those that cannot be meaningfully appropriated because their association with the invention is extremely tenuous).

¹⁹⁵ *Crown Cork*, 304 U.S. at 174 (Black, J., dissenting). What Justice Black referred to as a “divisional” is now known as a “continuation.”

¹⁹⁶ See Lemley & Moore, *supra* at note 8, at 111 (opining that allowing patentees to obtain claims covering “a competitor's product where the patentee had not contemplated the embodiment prior to seeing the competitor's device” is “a particularly offensive practice”).

¹⁹⁷ Merges, *supra* at note 62, at 1653-54.

¹⁹⁸ See *Aronson v. Quick Point Pencil Co.*, 440 U.S. 257, 262 (1979) (“First, patent law seeks to foster and reward invention; second, it promotes

depends on the incentive necessary, in comparison to the cost of the monopoly. Labeling a particular patent scope as “unfair” does not determine whether it is nonetheless optimal.

To take an extreme example, suppose that a scientist created a cure for AIDS and demonstrated that it works, but is unwilling to disclose how to make it simply for a 20 year patent over his invention. Instead, he demands that Congress pass special legislation granting him a broad 20 year monopoly covering not just his cure for AIDS, but every future method of treating AIDS. This would plainly be unfair extortion, since future methods of curing AIDS may prove very different and more effective. And granting such a special patent would clearly hamper our ability to conduct research.¹⁹⁹ But whether society needs a cure for AIDS so badly as to warrant capitulating is a close question. Change the hypothetical from AIDS to a new killer disease threatening to imminently wipe out all humanity with no foreseeable alternative cure, and the balance shifts decisively towards capitulating to the scientist’s demands, no matter how outrageous. Indeed, there is no particular reason why the monopoly must be related in subject-matter to the invention: the example would work just as well if our scientist had demanded a 20 year monopoly over penicillin, or even the wheel, as the reward for curing AIDS.²⁰⁰

The unfairness of capturing more than what the patentee actually invented is therefore another iteration of the question of optimal patent scope; reflecting a tension between initial and subsequent research that patent law has long recognized.²⁰¹ Higher levels of

disclosure of inventions . . . ; third, the stringent requirements for patent protection seek to assure that ideas in the public domain remain there for the free use of the public.”)

¹⁹⁹ Cf. *The Incandescent Lamp Patent*, 159 U.S. 465, 472-73 (1895) (discussing how early developers of the incandescent lamps prior to Edison had very broad patent claims but only a rudimentary device).

²⁰⁰ There is a perfectly good legal reason. U.S. Const. Art. I, § 8 (empowering Congress to grant “inventors the exclusive right to *their* . . . discoveries” (emphasis added)).

²⁰¹ *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 152 (1989) (“The tension between the desire to freely exploit the full potential of our inventive resources and the need to create an incentive to deploy those resources is constant.”); *Brenner v. Manson*, 383 U.S. 519, 534-35 (1966) (“Unless and until a process is refined and developed to this point - where specific benefit exists in currently available form—there is insufficient justification for permitting an applicant to engross what may prove to be a broad field.”); *Incandescent Lamp*, 159 U.S. at 472-73 (“Was everybody then precluded by this broad claim from making further investigation?”); *Cary v. Longman*, 102 Eng. Rep. 138, 140 n.(b) (K.B. 1801) (“we must take care to guard against two extremes equally prejudicial; the one, that men of

patent reward create more incentive for pioneers, but hinder the work of subsequent users.²⁰² Granting the broad patent to our hypothetical scientist will get us the cure for AIDS now, but stifle future research into other cures.²⁰³ How to strike the balance has been a subject of extensive theoretical debate.²⁰⁴

Viewed through these lens, “misappropriation by amendment” of someone else’s invention is a simple wealth transfer—not *definitively* bad even if generally dubious.²⁰⁵ There is, however, a more specific objection to the use of *ex post* claiming to capture *future* developments that the patentee could not have appreciated at the time of filing.

Regardless of the level of incentive required to spark pioneering innovation,²⁰⁶ there is an additional question of how that incentive should be delivered. Patent protection can be delivered by either broader patents or longer patents. Length and breadth are, to some

ability . . . may not be deprived of their just merits, and the reward of their ingenuity and labour; the other, that the world may not be deprived of improvements”); see generally Merges & Nelson, *supra* at note 30, at 872-77; Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. Econ. Persp. 29 (1991).

²⁰² Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 Tex. L. Rev. 989, 998 & n.32 (1997) (“efficient creation of new works requires access to and use of old works”).

²⁰³ Under current patent law subsequent improvers can obtain “blocking patents” over later insights. See John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. Chi. L. Rev. 439, 455-57 (2004) (“the right to prospect for further inventions within a patent’s claims remains a common right, not subject to the control of the patent holder”). But it does not have to be so: we could theoretically provide pioneers with even broader rights that preempt subsequent improvers, which will provide some incentive for pioneers (at a cost of reducing the incentives of subsequent improvers).

²⁰⁴ Compare Merges & Nelson, *supra* at note 30, at 872-77 (arguing that patents should have limited scope to permit subsequent innovators to compete) with Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & Econ. 265, 276-80 (1977) (arguing that the pioneer should receive broad rights to prevent wasteful duplication among subsequent innovators).

²⁰⁵ See Herbert Hovenkamp, *Antitrust’s Protected Classes*, 88 Mich. L. Rev. 1, 14 (1989) (“When wealth is merely transferred, society as a whole is neither better nor worse off.”).

²⁰⁶ Kitch argues that patents not only provide incentives to pioneers, they also deter subsequent innovators from wasteful duplication of research. Kitch, *supra* at note 204, at 276-80. But *ex post* claiming cannot deter subsequent innovators, because *ex post* claims provide *no notice* to the subsequent innovators that Kitch seeks to deter.

degree, substitutes for each other.²⁰⁷ If our scientist is not content with a 20 year monopoly on his method of curing AIDS and wants all future cures, perhaps he could be tempted instead with a 30-year or 40-year monopoly on his method alone.

Using *ex post* claiming to capture new insights is an example of additional patent breadth. The problem is that, at the time of patent filing,²⁰⁸ future insights are by definition *unknown* to the patentee.²⁰⁹ Unlike a definitive promise of penicillin or the wheel, *ex post* claiming promises patentees only a black box of “unknown future competitor insights.”²¹⁰ Whether competitors will have *any* insights, and whether those insights will prove to be very valuable or virtually worthless, is subject to tremendous uncertainty at the time of patent filing.²¹¹ And after filing occurs, society receives no more benefit from the patentee.

Of course, even vague and speculative expectations of future benefit confer *some* incentive to innovate.²¹² The problem is that this incentive is very small after risk discounting, and entirely disproportionate to

²⁰⁷ See Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 Mich. L. Rev. 985, 1001-07 (1999) (suggesting lengthening patent term and reducing patentee's monopoly power); Richard Gilbert & Carl Shapiro, *Optimal Patent Length and Breadth*, 21 RAND J. Econ. 106, 111 (1990) (suggesting that optimal patents might be extremely long but quite narrow).

²⁰⁸ A patentee's relevant investment decisions are complete at the time of filing: the investment to research a patentable invention occurs beforehand, and the investment of disclosing that invention is made by filing. Thus, the time of filing is the determinative time for calculating patent incentives for innovation.

²⁰⁹ See Meurer & Nard, *supra* at note 11, at 1993 (“Since entry [of an unclaimed competitor product] is unforeseen and does not occur until the second period, the effect on the incentive to invent is muted.”).

²¹⁰ An important assumption underlying this analysis is that inventors regard a monopoly with a *defined* scope, such as over penicillin or the wheel, as more predictable than an *undefined* scope. Of course, even a defined monopoly such as that over penicillin has considerable commercial uncertainty, so the patentee's monetary return is always uncertain. The analysis holds, however, so long as the uncertainty is reduced.

²¹¹ See Robin Feldman, *Rethinking Rights in Biospace*, 79 S. Cal. L. Rev. 1, 40 (2005) (granting rights “projects an enormous shadow across the future, one whose size cannot even be contemplated at the time of the invention”).

²¹² See *Eldred v. Ashcroft*, 537 U.S. 186, 214-15 (2003) (finding *ex ante* incentive from the expectation of future lengthening of copyright).

the monopoly cost incurred.²¹³ In short, society gets very little incentive bang for the monopoly cost buck.

To take a numerical example, if the value of later developments has a 50% chance of being \$200, and a 50% of being zero, the cost created by permitting *ex post* claiming is \$100. The increase to a patentee's incentive, however, is something significantly less than \$100 because people are risk-averse.²¹⁴ The more variance in the value of later developments, the greater the disconnect between the incentive created at the time of filing and the later cost to be borne.²¹⁵

Unforeseen developments are not limited to new competitor insights reflected in new products. All patent outcomes are subject to some level of uncertainty.²¹⁶ Indeed, litigation over the scope of property rights inherently involves some degree of *ex post* clarification.²¹⁷ But the uncertainty is particularly great—and therefore the risk discount

²¹³ See *id.* at 255 (Breyer, J., dissenting) (noting that “a 1% likelihood of earning \$ 100 annually for 20 years, starting 75 years into the future, is worth less than seven cents today”). Justice Breyer’s calculation was made with a 7% discount rate. *Id.* at 268. Given the degree of uncertainty involved, the discount rate for *ex post* claiming is likely to be a great deal higher. Cf. William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. Chi. L. Rev. 471, 481 n.22 (2003) (noting that incentive benefits and monopoly costs should be discounted at different rates).

²¹⁴ It is important to understand the economic concept of risk in this discussion. “Risk” and “risk-aversion” means that people prefer a guaranteed payment of \$100 over a 50% chance of obtaining either \$200 or \$0. The aversion is to *variance*, not to simple downside loss. Risk aversion is a fundamental assumption of modern economics. See Milton Friedman and L.J. Savage, *The Utility Analysis of Choices Involving Risk*, 56 J. Pol. Econ., 279 (1948); but see F.M. Scherer, *The Innovation Lottery*, in *Expanding the Boundaries of Intellectual Property: Innovation Policy in the Knowledge Society* 3, 15-19 (Rochelle Cooper Dreyfuss et al. eds., 2001) (arguing that investing in patents is like buying a lottery ticket, and thus some patentees are not risk averse).

²¹⁵ The future costs would be discounted too, but at the lower social discount rate. See Kenneth J. Arrow & Robert C. Lind, *Uncertainty and the Evaluation of Public Investment Decisions*, 60 Am. Econ. Rev. 364 (1970).

²¹⁶ Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. Econ. Persp. 75, 95 (2005).

²¹⁷ See Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty About Property Rights*, 106 Mich. L. Rev. 1285, 1295-99 (2008) (discussing limits on the *ex ante* certainty of scope for all property). Copyright litigation, for example, often involves the question of whether an accused work is “substantially similar” to the copyrighted work. *Arnstein v. Porter*, 154 F.2d 464 (2d. Cir. 1946). The determination of “substantial similarity” is necessarily done *ex post*.

particularly high—when the scope of monopoly is defined as something to arise in the future and therefore inherently uncertain.²¹⁸

This problem of uncertainty is not limited to misappropriation of competitor insights. It arises in every situation where patentees benefit from highly unpredictable developments that are determinable only after filing. One important category of *ex post* claims with this defect is an amendment to avoid unknown prior art that is discovered after filing.

The universe of prior art is vast, and a patentee cannot realistically know that his claims are patentable over all prior art at the time of filing. Although the patentee can certainly believe *some* features of his specification disclosure to be novel over the prior art, those will be the features in his *original* claims at the time of filing. A patentee using *ex post* claiming to overcome some particular prior art reference almost invariably does so because that prior art reference was unknown at the time of filing; and those *ex post* claims will be directed to features in his specification that he did not regard as significant at the time of filing.

A patentee making investment decisions (to research an invention and to disclose it by filing for patent) can only assess the likelihood of obtaining a patent in light of the prior art known to the patentee, and then apply a risk discount for the possibility of more prior art being later discovered by examiners and accused infringers. The benefit of allowing *ex post* claiming to circumvent prior art is to reduce the risk discount; but this benefit itself is subject to uncertainty discounting. Just as the patentee cannot predict what prior art is likely to arise, he correspondingly cannot predict whether *ex post* claiming will save him from that unknown prior art. As in the case of capturing unforeseen insights, *ex post* claiming to avoid unforeseen prior art increases the monopoly cost to society (the patentee receives a narrowed monopoly if he is permitted to amend around a surprise reference, while he receives nothing otherwise); but increases the patentee's incentive to invent at the time of filing only very slightly. This is effectively a windfall gain to the patentee: *ex post* increases in monopoly coverage that greatly exceeds the *ex ante* incentive effect. The inefficiency of such windfalls urges against allowing patentees to claim *ex post* that which he did not consider significant at the time of filing, whether the purpose is to cover competitor products or to avoid prior art.

²¹⁸ Meurer & Nard, *supra* at note 11, at 1998 (“an inventor's incentive is not harmed much when, *ex post*, she is denied patent scope over technology that she did not foresee *ex ante*”).

B. Allocating the Risk of Claim Mistake

Ex post claiming need not always be used to capture later insights. Occasionally, a patentee will seek to modify his claims *ex post* with some clear evidence that the corrected claim reflects his original insights at the time of filing, but were not reflected in the claims due to simple mistake.²¹⁹ In such cases, the concern of a windfall gain disappears.²²⁰

However, a patentee's claim drafting mistake can instead cause harm to competitors to the extent they rely on patent claims.²²¹ Where a claim drafting mistake causes competitors to rely on the issued (mistaken) claim and engage in conduct that (1) is not infringing under the mistake-infected claim scope,²²² (2) is infringing under the correct claim scope, and (3) would not have been engaged in "but for" the mistake in the claim, there is loss caused by the mistake: the competitor's infringement liability.²²³ Holding the competitor liable allocates this loss to the competitor; exempting the competitor from liability allocates the loss to the patentee. The broad scope of *ex post* claiming allocates this risk of mistake to the competitor.²²⁴

²¹⁹ See, e.g., *Lemelson v. Gen. Mills, Inc.*, 968 F.2d 1202, 1203 & n.3 (Fed. Cir. 1992) (claiming a "trackway" instead of a "trackway toy," even though the entire specification was directed to a toy).

²²⁰ See *Grant v. Raymond*, 31 U.S. (6 Pet.) 218, 242 (1832) (inventor should not be punished for innocent mistake when the "public yields nothing which it has not agreed to yield").

²²¹ Of course, a windfall gain to patentees as described in Part II.A also eventually harms competitors. The key difference is that mistakes in claims only cause harm if the claim is relied upon in some way. Jonathan A. Platt, Note, *Protecting Reliance on the Patent System: The Economics and Equities of Intervening Rights*, 47 Case W. Res. L. Rev. 1031, 1055 (1997) ("Requiring reliance distinguishes infringers that were misled by the errors of the original patent from those who were indifferent to those errors such that they would presumably have undertaken the infringing activity even if the original patent had been correct."); see *Slimfold Mfg. Co. v. Kinkead Indus.*, 810 F.2d 1113, 1117 (Fed. Cir. 1987) (noting infringer "did not demonstrate that it relied to its detriment on any aspect of the original claims that was changed by reissue").

²²² This can either be because the conduct falls outside the scope of the claim, or because the mistake-infected claim is invalid. "An invalid patent cannot be infringed." *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579 (Fed. Cir. 1983).

²²³ Platt, *supra* at note 221, at 1057-65.

²²⁴ Intervening rights mitigates this risk to some extent. However, intervening rights do not apply to continuations and *ex post* claiming strategies in litigation. See Parts I.C and I.D.3, *supra*. Even where they currently exist (for reissue and reexamination proceedings), they are

There is already have a well-established system of law for dealing with mistakes that cause harm to third parties: the law of torts. The tort analogy offers three possible rules of allocating the loss, which comprises the competitor's liability for infringement, also equaling the patentee's lost profits or royalties.²²⁵ These are: (1) strict liability on the competitor, the current law of *ex post* claiming; (2) allocate to the more negligent party, where the patentee bears the loss if he could have avoided the mistake more easily, and vice versa; and (3) strict liability on the patentee for the mistake.

1. Negligence.

The case for allocation of loss under a negligence rule (over the current default allocation of loss on the competitor) is easy to make. In standard economics, the risk of loss should be allocated to the party best able to avoid the mistake that causes the loss—the cheapest cost avoider.²²⁶ This provides that party with the incentive to avoid that loss.²²⁷

For example, if the mistake in claim drafting causes the competitor to take \$100 of monopoly profit from the patentee, this lost profit is a loss that must be allocated. If we hold the patentee liable for this loss (by absolving the competitor of infringement liability), then the patentee, *ex ante*, will rationally spend up to \$100 to draft better claims that avoid the mistake—thus preventing the competitor from encroaching and taking away the monopoly profit in the first place. On the other hand, if the loss is allocated to the competitor, the competitor will, *ex ante*, rationally spend up to \$100 to avoid infringing. The competitor can do so by hiring patent lawyers to examine the

inadequate to fully protect competitors. See text accompanying note 288–290, *infra*.

²²⁵ 35 U.S.C. § 284 (damages for infringement).

²²⁶ See Calabresi, *supra* at note 14, at 135-38; see also Steven Shavell, *Economic Analysis of Accident Law* 17-18 (1987). In a world without transaction costs, of course, the cheapest cost avoider will emerge by market forces alone. Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. Econ 1, 8 (1960) (“The ultimate result (which maximizes the value of production) is independent of the legal position if the pricing system is assumed to work without cost.”).

²²⁷ Steven Shavell, *Foundations of Economic Analysis of Law* 177-82 (2004) (discussing deterrence as the function of liability rules); see Gary T. Schwartz, *Reality in the Economic Analysis of Tort Law: Does Tort Law Really Deter?*, 42 UCLA L. Rev. 377, 443 (1994) (finding that tort law provides some incentive to avoid loss); cf. Guido Calabresi & Jon T. Hirschoff, *Toward a Test for Strict Liability in Torts*, 81 Yale L.J. 1055, 1060 (1972) (arguing that liability should be allocated to the party best able to undertake the cost-benefit analysis).

specification and the prior art, thereby designing a product that falls outside the theoretical limits of *ex post* claiming (*i.e.* a product that is not described in the specification or is completely covered by the prior art).

Between these two alternatives, the patentee is the cheaper cost avoider. It is easier for the patentee to describe what he believes himself to have invented than for competitors to prove from the specification and the prior art what the patentee did not invent.²²⁸ Crafting a one-sentence claim that accurately covers their own invention with precision may be difficult for patentees;²²⁹ but discerning the potential scope of a multi-page specification,²³⁰ and then subtracting from that scope the enormous universe of prior art, is even more difficult for accused infringers.²³¹ Moreover, while the patentee need claim properly once for every patent, multiple competitors must replicate their avoidance efforts.²³² Thus, the loss arising from a claim drafting mistake should be allocated to the patentee, where the drafting mistake is avoidable at reasonable cost. Stated another way, the patentee should *at least* be compelled to take reasonable care in drafting his claims, expending cost-justified amounts on claim refinement to avoid harming competitors.

This result is not changed by the fact that the competitor can engage in some measures that reduce the likelihood of the mistake causing loss. Where *both* parties are negligent, leaving the cost where it lies (but with the threat of shifting it to a unilaterally negligent party) provides efficient incentives for both parties to avoid negligent behavior—while shifting the cost does not change these incentives but

²²⁸ *Merrill v. Yeomans*, 94 U.S. 568, 573-74 (1877) (“It seems to us that nothing can be more just and fair, both to the patentee and to the public, than that the former should understand, and correctly describe, just what he has invented, and for what he claims a patent.”).

²²⁹ Lichtman, *supra* at note 15, at 2016-18.

²³⁰ *See, e.g., Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 433-35 (1822) (placing obligation on the patentee “to describe what his own improvement is, and to limit his patent to such improvement”).

²³¹ And even were it possible, it would leave the patentee with effective coverage of everything literally disclosed in the specification and not covered by prior art—as competitors would avoid that potential *ex post* claiming zone. This allows the patentee a monopoly over later competitor insights that were literally disclosed but not subjectively appreciated by the patentee at the time of filing, with all the windfall gain problems described in Part II.A.

²³² The converse is also true in that patentees who devote resources to perfecting claims that are never relied upon are wasting effort. See Part II.B.3.

incurs administrative costs.²³³ Here, the loss initially lies with the patentee, who must sue the accused infringer for infringement to recover the lost monopoly profit. Where the patentee is negligent in a drafting mistake, causing his own lost monopoly profits, there is no reason to shift this loss to the accused infringer.²³⁴

2. Strict Liability.

The more difficult question is the allocation of loss where the mistake is *not* avoidable at reasonable cost. If the harm to competitors is \$100, but the marginal cost of hiring patent attorneys to draft better claims (that would avoid the mistake) is \$200, the patentee will rationally not hire the patent attorney. Instead, the patentee will simply absorb the cost as part of doing business. Similarly, for competitors, if the liability for infringement is \$100, but the cost of hiring lawyers to analyze the specification and search for prior art is \$200, the competitor will simply pay for infringement instead.²³⁵ Allocating liability in these circumstances will not result in greater care (e.g. better claim drafting) to avoid the loss.²³⁶

Instead, allocation of strict liability will result in reduction in the level of activity; and the appropriate allocation depends in part on the comparative merits of those activities between the parties.²³⁷ The

²³³ Posner, *supra* at note 14, § 6.4 at 174 (“Since efficiency is not enhanced by making the negligent injurer pay damages to the negligent victim, the common law traditionally allowed the cost of the accident to lie where it fell Surprisingly, comparative negligence has the same effects on safety as contributory negligence.”).

²³⁴ Oliver Wendell Holmes, *The Common Law* 76-77 (Howe ed. 1963). It is conceivable, though extremely unlikely, that the accused infringer will be lower cost avoider. Such a circumstance may occur if (1) the mistake that is facially evident from the public record; and (2) the nature of the mistake is more easily realizable in the context of an accused product. Because patentees have an enormous comparative advantage in discerning their own invention, it is safe to say that such cases are virtually non-existent.

²³⁵ See Doug Lichtman, *Patent Holdouts in the Standard-Setting Process* 5, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=902646 (“a firm cannot hope to reliably identify all previously undiscovered patents relevant to a given technical standard”).

²³⁶ Richard A. Posner, *A Theory of Negligence*, 1 *J. Legal Stud.* 29, 32-34 (1972) (“If the cost of safety measures or of curtailment—whichever cost is lower—exceeds the benefit in accident avoidance to be gained by incurring that cost, society would be better off, in economic terms, to forego accident prevention.”).

²³⁷ See Posner, *supra* at 14, at § 6.5 at 178-79 (“if a class of activities can be identified in which activity-level changes by potential injurers are the most efficient method of accident prevention, there is a strong argument for imposing strict liability”).

comparative merits of patentee activity and competitor activity appear balanced, or, at least, vary according to circumstance. Patentees engage in innovative activity and, if forced to absorb the unavoidable loss, will reduce their level of innovation investment. At the same time, competitors (who rely on mistakenly-drafted claims) are engaging in improvement activity, and if forced bear the loss will equally reduce such investments. Whether one is more valuable than the other is difficult to say.²³⁸ Although individual circumstances—such as the ability to diversify risk—may change the calculus, it would be difficult to confine *ex post* claiming to only those circumstances where patentees are unable to diversify risk and their potential competitors could.

Because we cannot say whether patentees or accused infringers are categorically better risk bearers, administrative convenience favors a strict liability allocation of the risk to patentees.²³⁹ Patentees should, at a minimum, bear negligence liability; yet it is very difficult to determine negligence in claim drafting contexts.²⁴⁰ The issue of reasonable care is essentially “how much in attorneys’ fees would have been necessary to draft a better claim *ex ante*?” The evidence that can be presented at an infringement trial on such an issue will surely be speculative. Strict liability is a much easier rule to implement. Moreover, it is important to note that there is *one* patentee, but potentially *many* accused infringers who each have to take precautions: avoidance of such duplicative effort would favor placing the burden on the patentee.

Finally, the availability of cost-justified precautions is not necessarily a dichotomy: perhaps the patentee could have made *some* cost-justified refinements in claim drafting that would have mitigated *some* of the loss, though not avoiding the loss entirely.²⁴¹ A strict

²³⁸ Lemley, *supra* at note 202, at 998 (“It is not enough to say that intellectual property law favors ‘creators’ – for here we have creators on both sides of the equation, and the law must choose between them.”); *see generally* text accompanying notes 201–204, *supra*.

²³⁹ Posner, *supra* at note 14, § 6.5 at 180-81 (“The trial of a strict liability case is simpler than that of a negligence case because there is one less issue, negligence.”). More accurately, this is a *no liability* allocation which reduces the number of legal claims, because we are letting the loss lie where it falls—on the patentee who cannot recover his lost monopoly profits or royalties. *See id.* (noting importance to administrative cost of not increasing the number of legal claims).

²⁴⁰ *See* Part II.B.1, *supra*.

²⁴¹ *See* Michael J. Meurer & Craig Allen Nard, *Patent Policy Adrift in a Sea of Anecdote: A Reply to Lichtman*, 93 *Geo. L.J.* 2033, 2034 (2005) (“We suspect that applicants often fail to fully refine their claim language because the DOE acts as a backstop.”).

liability regime is appropriate to calibrate these incentives because strict liability motivates the loss bearer to take all cost-justified precautions; while a negligence rule makes such determinations dependent on the legal process.²⁴²

3. The Importance of Causation

One final point, however, needs to be emphasized. It is important not to over-deter claim drafting mistakes beyond the harm actually caused.²⁴³ Society loses if patentees spend money to avoid claim drafting mistakes or reduce their innovation investment (as they surely will if those mistakes result in lost claim scope) when those mistakes cause no harm.²⁴⁴ Thus even strict liability requires causation.²⁴⁵ And the “harm” here is the competitor’s *reliance* on the mistakenly drafted claim (so long as the patentee is not seeking to capture later insights); not the difference in claim scope absent such reliance.²⁴⁶

The difference is most simply demonstrated where the competitor never saw the mistakenly-drafted claim; which is common even for issued patents.²⁴⁷ The reliance harm would be zero. Likewise, the reliance harm is greatly reduced if the competitor would have infringed

²⁴² Posner, *supra* at note 14, § 6.5 at 178 (“Judicial inability to determine optimal activity levels except in simple cases is potentially a serious shortcoming of a negligence system. . . . In contrast, potential injurers subject to a rule of strict liability will automatically take into account possible changes in activity level, as well as possible changes in expenditures on care, in deciding whether to prevent accidents.”).

²⁴³ See Thomas C. Galligan, Jr., *Augmented Awards: The Efficient Allocation of Punitive Damages*, 51 La. L. Rev. 3, 49 (1990) (over-deterrence leads to inefficient over-investment in safety). Super-compensatory damages are usually justified on grounds that not all wrongs are detected. Werner Z. Hirsch, *Law and Economics: An Introductory Analysis* 200 (2d ed. 1988) (“By forcing the defendant to pay punitive damages, the law is in effect extracting compensation for the defendant’s undetected torts.”). The harm to competitors from drafting mistakes is necessarily detected, because it arises only when the patentee alleges infringement.

²⁴⁴ Or, more accurately, *expected* harm. Internalizing the expected harm *ex ante* (at the time of original claim drafting) is achieved by allocating the *actual* harm *ex post*. Posner, *supra* at note 14, § 6.7 at 187 (tort law fully compensates the actual harm to the “eggshell skull” victim to offset the lack of harm in the “rock skull” case).

²⁴⁵ See 63 Am. Jur. 2d (Products Liability) § 627 (proximate causation for strict products liability).

²⁴⁶ Platt, *supra* at note 221, at 1057-65.

²⁴⁷ Lichtman, *supra* at note 15, at 2022-23 (“notice is a relevant consideration only to the extent that patents are actually read, and in reality very few patents are”).

the mistakenly-drafted claim as well (and that claim was valid).²⁴⁸ In such circumstances reducing the patent scope confers a windfall gain to accused infringers; and an unnecessary loss on patentees. By contrast, where the accused infringer expressly relies on mistaken claim language to “design-around” the patent, the reliance harm from *ex post* claiming is directly commensurate with the difference in claim scope.

Thus, when the patentee makes a mistake in claim drafting, we should impose strict liability to the extent of competitor harm *caused* by the mistake, which will usually be the additional claim scope sought by the patentee; if the accused infringer had notice of the patent and was designing around the mistakenly-drafted claim.²⁴⁹ But it is important to emphasize that accused infringers are not harmed by a mistake *unless* they rely on the mistakenly-drafted claim; and the penalty imposed upon the patentee should be proportionate to the loss caused, to create the proper level of deterrence.

III. SUGGESTED REFORMS

Following from the above analysis, a patentee will omit important features from his original claims—thus necessitating *ex post* claiming—only in two circumstances.²⁵⁰ First, he did not appreciate the significance of a particular feature at the time of filing, and is seeking to capture later insights through *ex post* claiming. This is undesirable because the incentive for innovation created by such *ex post* claim scope is inherently discounted by the patentee. Second, a patentee may attempt to remedy a prior mistake in articulating his invention. This is undesirable only when competitors rely on the mistakenly drafted claim. Because it is socially wasteful to compel patentees to over-invest in claim refinement, the problem over-deterrence counsels against imposing a blanket prohibition on *ex post* claiming.

²⁴⁸ I say “reduced” rather than “zero” because patent litigation outcomes are, to some degree, probabilistic. Lemley & Shapiro, *supra* at note 216. Thus, an *ex post* claim may enhance the patentee’s settlement and licensing position even if it is not ultimately outcome-determinative at the end of litigation.

²⁴⁹ As a theoretical matter, it is possible that a competitor would still have deliberately infringed the correct claim if he had known about it. But the treble damages liability for willful infringement makes such deliberate infringement unlikely. *Cf.* RESTATEMENT (SECOND) OF TORTS § 402A cmt. j (1965) (presumption that warnings are heeded).

²⁵⁰ *See* Sarnoff, *supra* at note 109, at 1209 (“The modern doctrine of equivalents [] operates principally as an insurance policy against potential but unrecognized mistakes in drafting or against potential but unforeseeable developments in technology.”).

Reform of *ex post* claiming practice, therefore, should preserve the ability to modify claims where (1) the patentee is not capturing later insights but rather remedying a mistake in articulating a prior insight already in the possession of the patentee; and (2) the penalty imposed upon the patentee by denying the ability to claim *ex post* is disproportionate to the harm caused by the mistake. At the same time, the limited benefit of permitting *ex post* claiming to rectify harmless mistakes must be balanced against the likelihood of abuse in claiming later-developed insights. Some reforms consistent with these principles follow. These proposals are complementary to each other and limit the scope of *ex post* claiming to appropriate boundaries (with the exception of reforming intervening rights, which assumes continued availability of post-issuance claim amendment).

A. Reintroduce the Late Claiming Doctrine

The “late claiming” doctrine has its genesis in the Supreme Court’s decision in *General Talking Pictures Corp. v. Western Electric Co.*²⁵¹ In that case, the Court granted certiorari to consider the question:

Can an inventor who has filed an application for patent, showing and describing but not claiming certain inventions, obtain a valid patent for said inventions by voluntarily filing a ‘divisional’ or ‘continuation’ application for said unclaimed inventions more than two years subsequent to public use of the said unclaimed inventions by him or his assignee or licensee?²⁵²

The Court answered the question in the affirmative, permitting the *ex post* claiming of previously disclosed but unclaimed subject-matter.²⁵³ However, there was an important caveat—the public use of the invention was by the patentee himself. The Court stated:

The patentee’s use was the only “public use” of the inventions *In the absence of intervening adverse rights* for more than two years prior to the continuation applications, they were in time.²⁵⁴

General Talking Pictures’ statement about “intervening adverse rights,” however, has been generally taken as *dictum*. The exception is the Second Circuit, which holds that presentation of new claims for the first time after competitor public use constitutes a statutory bar.²⁵⁵

²⁵¹ 304 U.S. 175 (1938).

²⁵² *Id.* at 177.

²⁵³ *Id.* at 183.

²⁵⁴ *Id.* (emphasis added).

²⁵⁵ *Kahn v. Dynamics Corp. of Am.*, 508 F.2d 939, 943 (2d Cir. 1974) (“[C]laims 15 and 16 . . . are invalid. They were not presented either under

This “late claiming” doctrine has been rejected by the Federal Circuit,²⁵⁶ and modern *ex post* claiming practice permits retroactive capture of competitor products through new continuation claims no matter how long after the competitor’s public use those claims were first presented.

The late claiming doctrine, however, serves the purpose of preventing later capture of competitor insights. Once a competitor’s insight is introduced into the market, a patentee’s claim (presented for the first time) seeking to capture that insight is precisely the type of *ex post* claiming that creates unnecessary windfall gains to the patentee. In such cases there is virtually no possibility that the patentee is seeking merely to rectify a prior mistake in articulation.

Although both *General Talking Pictures* and *Khan* relied on 35 U.S.C. § 102(b), which provides (in its modern form) a one-year grace period after public use,²⁵⁷ there is little reason for this grace period when a competitor product is on the market. If the competitor has publicly demonstrated new insights, the patentee has every reason to seek to capture those insights immediately; but society has no reason to permit the patentee to do so. A limit on the retroactive capture of competitor products and insights, therefore, can be achieved by extending the reasoning of *General Talking Pictures* and *Khan* to encompass invalidity under 35 U.S.C. § 102(a), which has no grace period.²⁵⁸ The effect of such a doctrine would be to deny claim amendments priority against third-party prior art. Intervening competitor insights would thus invalidate the new claim instead of becoming captured.

the original or the continuation application until more than one year after equipment substantially the same as that charged to infringe had been on sale and delivered to customers. See 35 U.S.C. § 102(b).”). The change from two-years in *General Talking Pictures* to one-year in *Khan* is due to the fact that § 102(b) was amended.

²⁵⁶ *Westphal v. Fawzi*, 666 F.2d 575, 577 (C.C.P.A. 1981) (rejecting *Khan*). Decisions of the Court of Customs and Patent Appeals are considered binding by the Federal Circuit. *South Corp. v. United States*, 690 F.2d 1368, 1370 (Fed. Cir. 1982) (*en banc*).

²⁵⁷ See 35 U.S.C. § 102(b) (“A person shall be entitled to a patent unless . . . the invention was . . . in public use . . . more than one year prior to the date of the application.”).

²⁵⁸ See 35 U.S.C. § 102(a) (“A person shall be entitled to a patent unless . . . the invention was known or used by others . . . before the invention thereof by the applicant for patent.”). The “known or used by others” requirement has been interpreted to mean *publicly* disclosed or used. *Carella v. Starlight Archery & Pro Line Co.*, 804 F.2d 135, 139 (Fed. Cir. 1986) (“The statutory language, ‘known or used by others in this country’ (35 U.S.C. § 102(a)), means knowledge or use which is accessible to the public.”).

B. *Impose an Appreciation Requirement*

More broadly, patent law should require evidence of *subjective* appreciation of the newly claimed feature as part of the patentee's invention at the time of filing. Because the patent reward is for the patentee's "invention," and the incentive is fixed at the time of filing, it is important to ask what the patentee subjectively *thought* his reward was going to be. To grant more reward than that—to give the patentee what he did not expect to receive—is an unnecessary windfall that is costly to society.

A weak version of the appreciation requirement already exists in priority contests between multiple patentees. When multiple inventors conceive the same invention, the first to conceive—rather than the first to file—receives the patent.²⁵⁹ To prove conception, however, the inventor must prove "contemporaneous recognition and appreciation of the limitations of the claimed invention, not merely fortuitous inherency."²⁶⁰ Because appreciation is a subjective inquiry,²⁶¹ it must be corroborated not only by evidence showing that the claimed invention was made with a particular feature, but that the inventor *considered* the particular feature as novel and a part of the invention that he later claims.²⁶²

Under current law, proof of appreciation is not required if the patentee does not claim an invention date earlier than the filing of the patent application.²⁶³ Instead, the question becomes one of written description under 35 U.S.C. § 112: whether a "person of ordinary skill" would have understood the claimed features as being disclosed in the specification.²⁶⁴ This lenient requirement—without a more demanding appreciation requirement—permits broad scope to capture later insights.²⁶⁵

It is no answer to say that description in the specification necessarily shows that the patentee appreciated the entire specification as his invention. That is plainly not true: the specification is intended to, and does, mix the novel features of an

²⁵⁹ 35 U.S.C. § 102(g).

²⁶⁰ *Mycogen Plant Sci., Inc. v. Monsanto Co.*, 252 F.3d 1306, 1314 (Fed. Cir. 2001).

²⁶¹ *Bosies v. Benedict*, 27 F.3d 539, 543 (Fed. Cir. 1994).

²⁶² *Invitrogen Corp. v. Clontech Labs., Inc.*, 429 F.3d 1052, 1065 (Fed. Cir. 2005); *Manning v. Paradis*, 296 F.3d 1098, 1105 (Fed. Cir. 2002).

²⁶³ *Hyatt v. Boone*, 146 F.3d 1348, 1352 (Fed. Cir. 1998) ("The filing of a patent application serves as conception and constructive reduction to practice of the subject matter described in the application.").

²⁶⁴ *Id.* at 1353-54.

²⁶⁵ See text accompanying note 190–195.

invention with old elements necessary to provide context.²⁶⁶ It is the *original claims* that, in all likelihood, most accurately reflect what the patentee considered to be novel at the time of filing. Having failed to include a particular feature in the original claims (which is the only reason he would need to make an *ex post* claim amendment); it is not unreasonable to require the patentee to demonstrate that the newly added feature was a part of his original invention: something he regarded as a novel part of his invention, and not originally claimed simply due to mistake.

C. *End Post-Issuance Claim Amendment*

The two problems of *ex post* claiming—capture of later insights and harm to competitors—become more problematic over time. At the time of patent filing, there are usually no later insights to capture. Before the patent’s claims are issued, competitors have nothing upon which to rely.²⁶⁷ Thus, while an appreciation requirement is necessary for pre-issuance claim amendments (to prevent capture of later insights), no protection of competitors is necessary at such a stage.

The flip side of the coin is that, once a patent issues and becomes potentially subject to competitor reliance, the increased risk of later insights being retroactively captured and competitor harm strongly counsels against permitting further claim amendments. The issuance of a patent provides competitors with the incentive to improve upon its contents.²⁶⁸ The risk of retroactive capture by the patentee of the fruits of such later improvements is great.

²⁶⁶ *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 434 (1822) (finding a specification that “describes the machine fully and accurately, as a whole, mixing up the new and old, but does not in the slightest degree explain what is the nature or limit of the improvement which the party claims as his own” to be inadequate).

²⁶⁷ Under 35 U.S.C. § 122, a patent application is usually published 18 months after filing, with the patentee’s original claims. Under a strong view of the patentee’s responsibility to articulate his own invention, competitors would be entitled to rely on these original claims, even in the absence of an issued patent. *Cf.* 35 U.S.C. § 154(d) (providing infringement remedy if competitor had actual notice of the application). At the same time, the patentee can prevent pre-issuance publication by foregoing foreign patents on the same invention, 35 U.S.C. § 122(b)(2)(B), making pre-issuance publication a less important factor.

²⁶⁸ *State Indus. v. A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985). This social interest was traditionally protected by the experimental use defense, permitting non-commercial experimental use of patented inventions, rather akin to the fair use defense in copyright law. *See Chesterfield v. United States*, 159 F. Supp. 371, 376 (Ct. Cl. 1958); *Sawin v. Guild*, 21 Fed. Cas. 554, 555 (C.C.D. Mass. 1813). The Federal Circuit has rendered the

By contrast, the risk of over-deterrence through penalizing harmless claim mistakes is greatly diminished. An original patent application takes, on average, nearly two years to issue.²⁶⁹ If the patentee cannot discover and correct an innocent mistake within that time, the chance is slight that he will (1) discover the mistake after issuance, (2) before the mistake causes harm to competitors, and (3) not have that discovery spurred by competitor insights. Although this is an empirical question, the risk of the rare patentee loss is likely to be outweighed by the administrative convenience of a bright-line rule forbidding post-issuance claim amendment.²⁷⁰ In the absence of such a bright-line rule, we must engage in a case-by-case determination of patentee appreciation (to prevent retroactive capture) and competitor reliance. These are costly to administer.

D. Tie Intervening Rights to Competitor Reliance

If post-issuance claim amendment is not abolished completely, the doctrine of intervening rights should at least be strengthened to prevent harm in cases of competitor reliance.²⁷¹ At the same time, the defense should not apply in the absence of reliance.

As described in Part II.B, the patentee should be strictly liable for the competitor harm arising from claim drafting mistakes. At the same time, it is important to not impose excess liability beyond competitor harm, to avoid over-deterrence.²⁷² And the degree of competitor harm turns on that individual competitor's reliance.²⁷³

As an initial matter, we might question whether an individualized reliance inquiry is appropriate. Patents are public documents to which

experimental use defense essentially dead-letter. *Madley v. Duke Univ.*, 307 F.3d 1351 (Fed. Cir. 2002).

²⁶⁹ Lemley & Moore, *supra* at note 8, at 71-73 (“Original patent applications that issue take an average of 1.96 years to issue, while patents with at least one continuation take an average of 4.16 years to issue.”).

²⁷⁰ If the rule is considered overly-harsh, we can achieve almost as good a result by demanding a very high standard of proof for post-issuance amendments. One example is the standard for post-issuance judicial correction, which requires that the mistake be shown to be (1) harmless, (2) not subject to reasonable debate, and (3) apparent from the face of the patent. *Hoffer v. Microsoft Corp.*, 405 F.3d 1326, 1331 (Fed. Cir. 2005).

²⁷¹ I am, of course, assuming that cases where the patentee is seeking to capture later insights is prohibited entirely under the late claiming doctrine or an appreciation requirement. The discussion here pertains only to whether the patentee should be permitted to correct a *bona fide* mistake.

²⁷² See text accompanying note 243–246.

²⁷³ See text accompanying note 246.

constructive notice is imputed.²⁷⁴ If infringers are irrebuttably presumed to have notice of the patent, fairness would suggest that they likewise be presumed to rely on that notice.²⁷⁵

This analysis, however, elevates legal form over the economic substance. Imputing notice infringers is a convenient legal fiction that overcomes the apparent unfairness of imposing liability on an innocent infringer who is ambushed by a submarine patent.²⁷⁶ It is, however, more accurate to say that patent law imposes liability regardless of notice.²⁷⁷ Such strict liability adds predictability to the innovation incentive.²⁷⁸ By giving a fixed scope of monopoly without regard to the method of trespass—*i.e.* whether by deliberate copying or by independent invention—we give patentees more *ex ante* confidence in the predictability of their reward.²⁷⁹

The economic function of intervening rights is quite different. As Part II.B demonstrates, intervening rights is quite efficient as a tort remedy, for the injury caused by the patentee's drafting mistake. Tort law, of course, recognizes presumptions.²⁸⁰ However, legal

²⁷⁴ *Boyden v. Burke*, 55 U.S. (14 How.) 575, 582 (1853) (“Patents are public records. All persons are bound to take notice of their contents.”).

²⁷⁵ *Sontag Chain Stores Co. v. Nat'l Nut Co.*, 310 U.S. 281, 295 (1940) (finding “implied knowledge” sufficient to support intervening rights).

²⁷⁶ See Marcus, *supra* at note 154, at 525 (describing the use of “submarine” patents to extract royalties from unknowing infringers).

²⁷⁷ *In re Seagate Tech., LLC*, 2007 U.S. App. LEXIS 19768 at *12 (Fed. Cir. Aug. 20, 2007).

²⁷⁸ See Mark Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 Mich. L. Rev. 1525, 1528-29 (2007) (arguing that the possibility of competition from independent inventors undermines the patent incentive); see also *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 490 (1974) (noting this important difference between patent protection and other incentive mechanisms).

²⁷⁹ Whether this strict liability is desirable can be debated. Several commentators have argued that patent remedies should be limited to copying by infringers. See Samson Vermont, *Independent Invention As a Defense to Patent Infringement*, 105 Mich. L. Rev. 475 (2006); Stephen M. Maurer & Suzanne Scotchmer, *The Independent Invention Defence in Intellectual Property*, 69 *Economica* 535 (2002). Patent law is also not entirely indifferent to actual notice of infringers. Deliberate copying triggers exposure to punitive damages, *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 508 (1964), while lack of notice can sometimes lead to reduced damages, 35 U.S.C. § 287 (2000).

²⁸⁰ See, e.g., *Jesionowski v. Boston & Maine R.R.*, 329 U.S. 452, 458 (1947) (*res ipsa loquitur*).

presumptions should bear some semblance to reality.²⁸¹ A presumption that accused infringers would avoid infringement *if* they have actual notice is plausible, given patent law’s heavy penalties for willful infringement.²⁸² A presumption that accused infringers always have such notice is not.²⁸³

Reliance on a claim drafting mistake necessarily requires the following: (1) the competitor saw the issued claim (containing the mistake); (2) the competitor did not know of the mistake; (3) the competitor does not infringe the mistaken claim, but does infringe the correct (*ex post*) claim; and (4) if the competitor had known of the correct *ex post* claim previously, he would not have commenced infringement.²⁸⁴ Of these, (2) and (3) will rarely be at issue because, if the infringer knew of the mistake or does not infringe even the corrected claim, the problems of *ex post* claiming are simply not relevant.

As above, a legal presumption that the competitor saw the issued patent containing the mistaken claim is simply contrary to reality. People, even competitors, rarely read patents or their claims because doing so increases litigation exposure.²⁸⁵ By the same coin, however, once competitors *do* have actual notice of a patent, litigation exposure provides a powerful incentive to avoid infringement. Thus, it is quite reasonable to assume that, if the competitor had known of the correct *ex post* claim previously, he would not have commenced infringement. Furthermore, because the quantification of the harm is the infringement damages—or, what amounts to the same thing, the patentee’s lost profits²⁸⁶—the harm corresponds to the *ex post* claiming scope provided there has been reliance. The proportionality inquiry is essentially dichotomous: either there has been competitor reliance, and the reliance harm corresponds to the *ex post* claiming scope; or there

²⁸¹ See *Eastman Kodak Co. v. Image Tech. Servs.*, 504 U.S. 451, 466-67 (“Legal presumptions that rest on formalistic distinctions rather than actual market realities are generally disfavored in antitrust law.”).

²⁸² *Aro Mfg.*, 377 U.S. at 508.

²⁸³ Lichtman, *supra* at note 15, at 2023 (“very few people read patents outside of the litigation and licensing contexts”).

²⁸⁴ See text accompanying notes 221–223.

²⁸⁵ See Note, *supra* at note 193, at 2023; Mark A. Lemley & Ragesh K. Tangri, *Ending Patent Law’s Willfulness Game*, 18 Berkeley Tech. L.J. 1085, 1100–01 (2003) (“[I]n-house patent counsel and many outside lawyers regularly advise their clients not to read patents if there is any way to avoid it.”).

²⁸⁶ 35 U.S.C. § 284 (2000) (patentee may recover damages adequate to compensate for infringement); *BIC Leisure Prods. v. Windsurfing Int’l*, 1 F.3d 1214, 1218 (Fed. Cir. 1993) (lost profits requires showing causation).

has been no reliance, and the reliance harm is zero, rendering it by definition disproportionate to the *ex post* claiming scope. Although the dichotomy is not absolute,²⁸⁷ in most cases the question of proportionality collapses into a question of reliance, which is in turn a question of actual notice.

To the extent that competitors received actual knowledge of the patentee's mistakenly drafted claim, they should be presumed to have relied upon the mistake within. The patentee should be denied the entire scope of *ex post* claiming as applied to that competitor.

To accomplish this allocation of risk, however, the current intervening rights doctrine requires some modification. First and foremost, intervening rights do not currently attach to continuation applications,²⁸⁸ an omission without any justification.²⁸⁹ Second, courts have rarely granted equitable intervening rights, and when they do so the equitable intervening rights are frequently limited to a competitor's paper profit.²⁹⁰ This ignores the cost of capital and business risk. If we cap the successful competitors at their fixed costs, and give the unsuccessful competitors nothing (due to simple market operation), then the *average* expected return will neither justify the initial competitor investment nor be sufficient to penalize the patentee for the full extent of his mistake. Thus, intervening rights doctrine should be broadened to include continuations, and cover the full scope of the competitor's reliance activities.²⁹¹

A narrowing modification, however, is necessary also. Absolute intervening rights do not require reliance,²⁹² though equitable intervening rights might.²⁹³ In a related vein, continuation claims do

²⁸⁷ See text accompanying note 248.

²⁸⁸ *Ricoh Co. v. Nashua Corp.*, 1999 U.S. App. LEXIS 2672, *9 (Fed. Cir. 1999); see also *Tex. Instruments, Inc. v. USITC*, 871 F.2d 1054, 1065 (Fed. Cir. 1989).

²⁸⁹ See Lemley & Moore, *supra* at note 8, at 109-10 (advocating creation of intervening rights).

²⁹⁰ See, e.g., *Plastic Container Corp. v. Continental Plastics, Inc.*, 607 F.2d 885, 902-03 (10th Cir. 1979) (no right to continue infringement when infringer had already made substantial profits); *Seattle Box Co. v. Indus. Crating & Packing, Inc.*, 756 F.2d 1574, 1581 (Fed. Cir. 1985) (permitting infringer to dispose of existing inventory, but nothing more).

²⁹¹ *Slimfold Mfg. Co. v. Kinkead Indus.*, 810 F.2d 1113, 1117 (Fed. Cir. 1987) (no intervening rights when infringer "did not demonstrate that it relied to its detriment on any aspect of the original claims that was changed by reissue").

²⁹² 35 U.S.C. § 252 (2000); *Sontag*, 310 U.S. at 295.

²⁹³ *Slimfold*, 810 F.2d at 1117.

not incur damages until after they issue, even if they are to correct a *bona fide* mistake, and competitors are not harmed.²⁹⁴

In the absence of reliance, and assuming there is no attempt by the patentee to capture later insights, intervening rights and intervening damages serve no purpose. They confer an unnecessary windfall on accused infringers, and penalize patentees, resulting in over-deterrence of claim drafting mistakes and inducing patentees to over-invest in claim-refinement.²⁹⁵ Where competitors are not harmed, neither intervening rights nor intervening damages should attach; instead, the correction of mistake should be fully retroactive.

E. Abolish the Doctrine of Equivalents

If reissue and continuation practice is reformed as I have suggested, the doctrine of equivalents will likely no longer be necessary, and should be abolished.

As with other mechanisms of *ex post* claiming,²⁹⁶ the doctrine of equivalents can be used by patentees either to correct mistakes in articulating their original insights or to capture later insights.²⁹⁷ Unlike reissue and continuation, however, the doctrine of equivalents is much more nebulous and difficult to scrutinize. When a claim is corrected through reissue or continuation, the patentee must *write down* his expanded claim. This allows a meaningful comparison between the old and new claims to determine whether it captures new insights. By contrast, finding that an accused device is “equivalent” to the old claim, without delineating the scope of equivalence in literal

²⁹⁴ *Nat’l Presto Indus. v. West Bend Co.*, 76 F.3d 1185, 1196 (Fed. Cir. 1996) (infringement does not cover pre-issuance activities). A very narrow exception is 35 U.S.C. § 154(d), where a patentee may obtain a reasonable royalty for pre-issuance infringement of a claim in a published application, that is “substantially identical” to the issued patent, and of which the accused infringer had actual notice.

²⁹⁵ *Cf.* Lichtman, *supra* at note 15, at 2019 (arguing that preserving the doctrine of equivalents is necessary because it is the only fully retroactive *ex post* claiming technique).

²⁹⁶ Continuations, reissues, and the doctrine of equivalents are close substitutes, and the question is which mechanism best serves the desirable policies that support *ex post* claiming. *See* Lichtman, *supra* at note 15, at 2013 (“to evaluate the doctrine of equivalents, ask whether an applicant can use continuations, the reissue proceeding, and more careful claim drafting to achieve the precise coverage”).

²⁹⁷ *See* text accompanying notes 183–188.

language, makes the inquiry less clear and more difficult to review on appeal.²⁹⁸

As Douglas Lichtman has pointed out, the doctrine of equivalents is different from reissue and continuations in two important ways.²⁹⁹ First, the doctrine of equivalents is fully retroactive, not subject to intervening rights or limits on damages. Second, the doctrine of equivalents applies throughout the life of the patent, whereas reissue proceedings cannot broaden a patent after two years.³⁰⁰

As outlined in Part III.D, whether patentees should receive retroactive damages in cases of mistake depends on whether the mistake is harmless, which in turn depends on whether competitors have notice. That inquiry is better considered under the rubric of intervening rights, where competitor reliance has been necessary in at least some cases.³⁰¹ By contrast, the doctrinal emphasis of the doctrine of equivalents is whether the competitor's product is so similar to the patentee's claim that the difference can be considered "insubstantial,"³⁰² a test that has nothing to do with competitor notice. The doctrine of equivalents is therefore a clumsy mechanism to determine whether a patentee drafting mistake is harmless and should be corrected with retroactive damages.

The second difference is that the doctrine of equivalents persists throughout the life of the patent, whereas broadening reissue and continuation applications must be initiated early in the patent's life.³⁰³ This, however, is a weakness of the doctrine of equivalents rather than a strength. If *ex post* claiming can be used legitimately only to correct mistakes in articulating insights held at the time of filing, the risk of abuse increases with time. A patentee who cannot articulate his own invention after nearly four years with one original application,³⁰⁴ or many more with continuation applications, is unlikely to ever be able to do so. By contrast, the risk of capturing later insights increases as

²⁹⁸ See Sarnoff, *supra* at note 109, at 1169-73 (describing how the imprecision of equivalency permits patentees to circumvent the doctrinal limits on claiming). This concern is, however, mitigated somewhat by the "hypothetical claim" approach. See text accompanying note 114.

²⁹⁹ Lichtman, *supra* at note 15, at 2018.

³⁰⁰ 35 U.S.C. § 251 (2000).

³⁰¹ *Slimfold*, 810 F.2d at 1117; *but see Sontag*, 310 U.S. at 295 (lack of knowledge of original patent does not defeat intervening rights).

³⁰² *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39-40 (1997) (describing the equivalence inquiry under the "triple identity" and "insubstantial differences" tests).

³⁰³ Lichtman, *supra* at note 15, at 2018.

³⁰⁴ That is, the average two-year pendency for a patent application to issue, *plus* the two years to seek reissue under the statute. See note 269.

time goes on. The temporal limitations on broadening reissue were imposed with exactly this policy in mind:

[U]nder the general terms of the law, such a reissue may be made where it clearly appears that an actual mistake has inadvertently been made. But by a curious misapplication of the law it has come to be principally resorted to for the purpose of enlarging and expanding patent claims. And the evils which have grown from the practice have assumed large proportions. Patents have been so expanded and idealized, years after their first issue, that hundreds and thousands of mechanics and manufactures, who had just reason to suppose that the field of action was open, have been obliged to discontinue their employments, or to pay an enormous tax for continuing them.³⁰⁵

The balance between the risk of capturing later insights and allowing patentees to correct legitimate mistakes, of course, is an empirical question.³⁰⁶ But whatever the optimal balance is, it is not likely to be permitting *ex post* claim amendment throughout the life of the patent. Nor is there any reason why it should be different between reissue, continuation, and the doctrine of equivalents—if the statutory two year period for broadening reissue is too short, that can simply be lengthened. Given the lack of clarity in the concept of “equivalence,” the goal of preserving patentees’ rights to remedy mistakes is better served through reissue proceedings and continuation applications, if those procedures are appropriately reformed.

One final objection that should be considered is that the definition of an “invention” should not be defined by the claims, but be interpreted to encompass all equivalents. In this view, the ability to capture later “equivalent” insight is not an inefficient windfall but instead protects part of the patentee’s invention in the first place. In short, an equivalent to an invention, by definition, has no meaningful difference, whether technically, legally, or economically and policy-wise. This was the reason given by the Supreme Court in permitting the doctrine of equivalents to be asserted against later independent inventors, without proof of copying.³⁰⁷

This reasoning, however, is weak and circular. There is a manifest economic difference between the claimed invention and the asserted

³⁰⁵ *Miller v. Brass Co.*, 104 U.S. 350, 354-55 (1882) (holding that thirteen year delay in seeking reissue resulted in laches).

³⁰⁶ See Part III.C.

³⁰⁷ *Warner-Jenkinson*, 520 U.S. at 35-36.

equivalent: the patentee did not see fit to claim the equivalent at the time of filing, despite having every ability to do so (if he had believed the equivalent to be part of his invention). That failure to claim when the opportunity presented itself was either because the patentee did not regard the equivalent as his invention, or because the patentee made a mistake. In neither case, however, is the appropriate remedy to rob the innocent competitor to pay the guilty patentee.³⁰⁸

CONCLUSION

The scope of a patent can be changed after filing, and after new insights are developed by competitors, through the mechanisms of *ex post* claiming. The ability to change claims renders them virtually meaningless. Instead competitors can only rely on the real limits of patent scope—the specification and the prior art. In short, our current patent system places the onus on competitors to discern, by a process of comparison with a long patent specification and a process of elimination from an nearly infinite universe of prior art, what the patentee will be able *ex post* claim with perfect hindsight.

A more sensible doctrine is to place the onus on the patentee. Because patentees have broad freedom to file multiple original claims, resort to claim amendment after filing occurs for only two reasons: to correct a mistake in articulating the patentee’s invention at the time of filing, or to cover later insights that are developed after filing. However, if the patentee is attempting to capture later insights, those insights are by definition unforeseen at the time of filing, and giving the patentee windfall rewards is not an efficient way of providing incentives to innovate or disclose. Similarly, if the patentee is attempting to remedy his own claim drafting mistake, the experience of tort law teaches that the patentee should pay for the harm caused by his own mistake. Indeed, even when the claim drafting mistake *cannot* be reasonably avoided, there is no apparent justification to shift the loss from where it initially lies—with the patentee.

³⁰⁸ The competitor is “innocent” in the sense that there is nothing wrong with attempting to design-around a patent while capturing some of the unclaimed subject-matter, as the *Warner-Jenkinson* Court recognized. *See id.* at 36 (discussing the “incremental innovator designing around the claims, yet seeking to capture as much as is permissible of the patented advance”). But even if designing-around were to be regarded as less-than-honorable, there remains no good policy reason why the doctrine of equivalents applies to *independent inventors*. At a minimum, limiting the doctrine of equivalents to copyists and the creators of derivative works would add substantial predictability to the doctrine and prevent opportunistic patentees from capturing later insights.

Following these general principles, patent law should strictly limit the ability to claim *ex post*. Even if claim amendments are not entirely banned, new claims should not receive retroactive priority. Additionally, patentees should be made to prove that they appreciated, at the time of filing, that the features sought to be added to an *ex post* claim was novel and significant, to prevent new distinctions emerging around unknown prior art discovered during prosecution. The principles of clarity and reliance become even more important after the patent issues, at which point a complete ban would be justified.

The caveat, however, is that patentees should not be made to bear losses that they did not cause, nor be over-deterred from their mistakes. Otherwise, there is the possibility that patentees will over-invest in claim refinement to prevent later loss of claim scope. One manifestation of this caution against over-deterrence is the doctrine of intervening rights. As I have demonstrated, the loss caused by a claim drafting mistake (as opposed to retroactive capture of new information) is the competitor's reliance on a mistakenly drafted claim, which cannot occur absent actual notice of the issued patent. The current scope of intervening rights therefore is overbroad and should be narrowed in this respect to provide full retroactivity in cases lacking competitor reliance, if post-issuance amendments continue to be permitted.