FIXING PATENT BOUNDARIES

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Fixing Patent Boundaries
Tun-Jen Chiang†

The claims of a patent are its boundaries, defining the scope of exclusion. This boundary function of claims is undermined by the fact that claims can be changed throughout the life of the patent, thereby moving the patent boundary. A boundary that can be moved-at-will is one that the public cannot rely upon.

This Article explores the problems of malleable patent boundaries. If claim amendment is made to permit a patentee to capture something he did not foresee when filing the patent application, the amendment confers an unexpected windfall that did not contribute to incentives to invent before filing. If claim amendment is done to permit a patentee to capture something he did foresee but mistakenly failed to claim initially, the amendment allows the patentee to shift the loss of his own mistake to third-parties. Either way, the amendment is inefficient.

I propose that patent boundaries should be fixed upon patent issuance, and post-issuance claim amendment disallowed. Because claims before issuance do not create public reliance, pre-issuance amendment should be retained. Nonetheless, the possibility of inefficient windfalls requires that pre-issuance amendment not be given retroactive priority to limit the ability to capture later developments.

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INTRODUCTION

Ask any patent lawyer what the most important part of a patent is, and the answer will invariably be "the claims." Claims are supposed to act as a patent’s boundaries, defining the patentee’s monopoly. As a boundary, the claim should "inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known


2 Astrazeneca AB, Aktiebolaget Hassle, KBI-E, Inc. v. Mutual Pharmaceutical Co., 384 F.3d 1333, 1336 (Fed. Cir. 2004) (“It is axiomatic that the claims mark the outer boundaries of the patent right to exclude.”).
which features may be safely used or manufactured without a license, and which may not.”

Much literature has criticized claims for failing to provide adequate public notice, usually attributing the problem to vagueness in claim language. My goal in this Article is to discuss another—much more problematic—reason that claims fail to act as meaningful patent boundaries. Simply put, claims can be explicitly changed throughout the patent’s lifetime, thereby moving the patent boundary. A constantly shifting boundary much worse than a vague boundary. A fence that is vague and has gaps is not ideal for telling people where not to trespass, but is better than no fence at all; a fence that is constantly moving is entirely useless.

Imagine a real property system where your neighbor is permitted to move his fence to encompass your new house. Moreover, he then sues you for trespassing and evicts you from the house. A real property system with such constantly moving fences would quickly break down, as people move fences in self-serving ways, litigate evictions, and stop building houses.

In comparison, a patentee is permitted to change his claims throughout the life of the patent, generally at-will with few substantive limits. The amended claim then retroacts upon competitors, forcing them to stop manufacturing, akin to evicting them from their factories. Similar to the prediction in real property, this lack of stable boundaries causes constant attempts to amend claims in self-serving ways, has sparked an explosion in patent litigation, and acts as a deterrent to productive investment in manufacturing, research, and innovation.

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3 *Permutit Co. v. Graver Corp.*, 284 U.S. 52, 60 (1931).


6 James Bessen & Michael J. Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* 130-44 (2007) (showing that, in most industries, litigation costs induced by the patent system exceed the research and development generated).
The fact that patent boundaries can be moved, at any time and within broad substantive limits, is one of the oddest and most problematic features of the patent system. Such generous provision for claim amendment is commonly defended on the grounds that this flexibility is necessary to allow patentees to benefit from later developments, unforeseen at the time of initial claim drafting; and to permit the cure of any inadvertent mistakes by the patentee when drawing up the claim boundaries. Neither is a compelling defense.

First, permitting patentees change claims in order to capture unforeseen developments is, by definition, to confer a windfall upon them. The ability to capture such windfalls contributes very little to the patentee’s incentive when he is investing in research and development, since the windfall is unforeseen at that time. Conferring unforeseen windfalls upon patentees therefore creates monopoly cost without corresponding gains in incentives to invent or disclose. This contradicts the basic purpose of the patent system.

Second, the ability to amend claims allows patentees to cure any mistakes they make in drafting them. But this happens by shifting the cost of the mistake to competitors, by making these competitors pay royalties based on the amended claim. Patentees thus profiting from their own mistakes have no incentive to avoid them, and indeed have a perverse incentive to deliberately commit such mistakes. Because patentees are the low cost avoider of claim drafting mistakes, this shifting of loss is inefficient.

I propose in this Article that issued patents should not be amended. This fixes the boundary of a patent upon its issuance, permitting claims to create a binding and meaningful boundary. Before the issuance of a patent, claim amendment is useful to fix mistakes, since before issuance such mistakes are harmless. To prevent inefficient windfalls, however, even pre-issuance claim amendment should not be

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8 Grant v. Raymond, 31 U.S. (6 Pet.) 218, 242 (1832) (arguing 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) (“continuation applications permit the patentee to undo mistakes (at least considered as such in hindsight)” (emphasis in original)).

permitted to capture later developments. This can be accomplished to
deny amended claims retroactive priority against third-party
activities.

Part I describes the basic doctrine of patent claims and procedures
for changing them. Part II analyzes the functions of written claims
and the ways that claim amendment undermine these functions. Part
III proposes several reforms, namely to end post-issuance claim
amendment and to deny retroactive priority to pre-issuance
amendments. Part IV considers some objections and alternatives to
my proposals. A brief conclusion follows.

I. THE PATENT CLAIM AS A BOUNDARY

A. The Basics of Patent Claims

It is commonly said that, in patent law, “the name of the game is the
claim.”\textsuperscript{10} The claim is a one sentence description of the invention,
drafted by the patentee, defining the scope of infringement.\textsuperscript{11} With
minor exceptions,\textsuperscript{12} the rule of patent law is that anything that is
literally described by a claim, infringes; and that which is not literally
described by a claim does not infringe. Because patent claims define
infringement, they are generally regarded as the boundary of a patent,
much as the boundaries of real property define trespass and the right
of exclusion.\textsuperscript{13}

A simple example demonstrates how claims work. A claim over a
table might be written as: “An apparatus comprising a flat surface and
four legs.” Written this way, a triangular table with three legs would
not be covered, while a four-legged table would. Moreover, it does not
matter for infringement that an infringing product has additional
features, as long as it had the minimum feature set specified. For
example, an table with a set of drawers attached or wheels at the
bottom still infringes, as long as it also had a flat top and four legs.

\textsuperscript{10} In re Hiniker Co., 150 F.3d 1362, 1369 (Fed. Cir. 1998) (quoting Giles S.
Rich, Extent of Protection and Interpretation of Claims – American
Perspectives, 21 Int’l Rev. Indus. Prop. & Copyright L. 497, 499 (1990)).


\textsuperscript{12} The primary exception is the doctrine of equivalents, which holds that
an “insubstantial difference” between a claimed element and a feature of the
accused product may not defeat infringement. See Warner-Jenkinson Co. v.
Hilton Davis Chem. Co., 520 U.S. 17, 29 (1997). This element-by-element
comparison requires the doctrine of equivalents to operate within the
strictures of the claim itself, retaining some boundary-defining role for claims
even in this context.

\textsuperscript{13} In re Vogel, 422 F.2d 438, 442 (C.C.P.A. 1970).
The purpose of the written claim is that they (theoretically) provide a clear and reasonably simple way to determine infringement. Each claim is supposed to be a bright-line rule that makes determining the answer to whether a product is covered by the claim reasonably easy and certain. In the absence of claims, judges and juries would be forced to determine patent infringement by looking to the entire patent specification instead of a single sentence, a task that would be difficult for a lay jury since the patent specification is technically complicated. And without claims, the jury would presumably determine infringement using a vague rule such as whether the two inventions are “similar,” leading to uncertainty. By providing the requisite simplicity and certainty, patent claims are supposed to “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.”

As described in a voluminous literature, patent claims often fail to provide the certainty desired in boundaries. The literature often attributes the cause to the fact that claims are vague, for reasons ranging from the inherent imperfections of language, the fact that patents sit on the cutting-edge of new technology where a technical vocabulary is still developing, to the lack of incentives within the patent system for patentees to write clear language. The story of linguistic vagueness as patent law’s primary problem has some resonance in that the Federal Circuit (which has exclusive jurisdiction in patent appeals) reverses in 30-40% of cases involving claim interpretation, suggesting that claims are vague and hard to interpret.

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18 See Kimberly A. Moore, Markman Eight Years Later: Is Claim Construction More Predictable?, 9 Lewis & Clark L. Rev. 231, 233, 239 (2005) (reporting a 34.5% reversal rate for claim construction). Notably, however, the Federal Circuit displays remarkable internal agreement on claim construction matters. Disagreement on claim construction between Federal Circuit judges is recorded in less than 5% of cases where the issue is raised. Id. at 243-44 (finding the figure to be approximately 3%); R. Polk Wagner & Lee Petherbridge, Is the Federal Circuit Succeeding? An Empirical Assessment of Judicial Performance, 152 U. Pa. L. Rev. 1105, 1155 (2004) (finding slightly less than 5%).
The difficulty of drafting clear claim language can be illustrated by the simple example above. What is a “flat surface”? Does it have to be absolutely flat or are minor variations allowed? Does a cushioned surface count, so that a chair would infringe the patent (surely a counter-intuitive result)? Even for simple technology, the translation of the intellectual idea behind the table into words is difficult.\textsuperscript{19} The complications of more sophisticated technology make the task even harder for many patents.

The vagueness of claims undermines the purpose of having them in the first place. A vague claim is neither easy to apply, nor does it provide certainty in the result. In the face of this difficulty, one solution that has developed in the U.S. patent system is to allow patentees a second chance to get the claim right.\textsuperscript{20} Indeed, patentees receive not only a second chance, but a third chance and a fourth chance—\textit{unlimited} chances throughout the life of the patent to redraft their claims. Thus, if it emerges a year after the patent issues that it is unclear whether the claim covers chairs with four legs, the patentee can seek to reissue his patent to make clear that, yes, he does claim chairs as part of his patent on tables, since chairs stand up in the same way as a table.

The problem with using \textit{ex post} claim amendment to clarify vagaries in claim language is this cure is worse than the disease. After all, a claim is supposed to “inform the public \textit{during the life of the patent} of the limits of the monopoly asserted”;\textsuperscript{21} and it does the public very little good to find out that chairs, cars, and all manner of other things sitting on four points are covered by the patent one year \textit{after} the patent issues. This problem is especially acute when (as is likely) the impetus for patentee clarification is that a competitor has already spent millions of dollars building a factory for making chairs in the belief that they did not infringe. The problem is magnified in that the patentee is permitted not only to clarify his claims, but to completely change them. A claim that expressly covered only tables with “four legs” can properly be changed later to cover something with three legs.

The effect of claim amendment is partially retroactive. While a amended claim cannot cover devices that were sold prior to the


\textsuperscript{21} \textit{Permutit}, 284 U.S. at 60 (emphasis added).
amendment, it can have retroactive effect against long-term investments. For example, a patentee changes his patent on four-legged tables to cover three-legged tables. This patentee cannot obtain royalties on the three-legged tables sold before the amendment receives patent office approval. However, the competitor who built a factory for manufacturing three-legged tables probably intended the factory to last for twenty years or more. The patentee can force his competitor to shut down the entire factory. This “hold-up” leverage allows claim amendment to have significant retroactive bite.

The fact that claims can be so easily changed, and with retroactive effect, makes their function as property boundaries questionable. Property rights generally have a degree of stability to facilitate investment by their owners and others. A property whose boundaries are constantly shifting is a bad vehicle for investment—both for the property owner and any potential trespassers. Imagine, for example, that the fence on your land was constantly moving in random directions. This would make it very risky for you to improve your land such as by building a house on it, because tomorrow the fence might move inwards and take away your ownership. On the other hand, your neighbors cannot improve their land either, because your fence might move outwards and strip them of their rights. To top it off, nobody would want to buy your land precisely because its future value is so hard to determine. Because patent claims are easily changed, they serve as poor boundaries, undermining the patent system for everyone.

In this way, claim changing is a much worse problem for boundary definition than simply vague claims, creating a cure worse than the disease. A vague claim is a fuzzy boundary, like a fence with gaps that leaves a few square feet of land ownership unclear. An amendable claim is a useless boundary, akin to a fence that is crystal clear today but which might be moved tomorrow, effectively rendering ownership of the entire tract unclear.

B. Constantly Shifting Patent Boundaries

Claim amendment can be implemented through a variety of procedural devices, depending on the time at which amendment is sought. This section provides a brief summary of these mechanisms.

22 Carol M. Rose, Crystals and Mud in Property Law, 40 Stan. L. Rev. 577, 591 (1988) (“Hard-edged rules define assets and their ownership in such a way that what is bought stays bought.”).


Logically, claim amendment cannot occur until there is a claim to start with. These “original claims” are filed as part of the patent application, which is filed with the United States Patent and Trademark Office (“PTO”). A patent application contains several things, but the two most important are the specification and the original claims. The specification is a detailed disclosure of the invention. For example, a specification describing a table will describe what it looks like (is it square or round); what it is made of (wood or plastic); how to make it (using nails or screws); and what it is used for (dining tables or reading desks). By contrast, the original claims—an application usually has several—are each a single sentence describing the invention in more general terms. For example, a claim over a table might read, “an apparatus comprising a flat surface and four legs.”

1. Pre-issuance amendment.

Under the statute, the original claims should reflect what the patentee “regards as his invention.” The patentee may, however, change his mind about what his invention is. The patentee who initially wrote a claim for four-legged tables may decide that he really invented all types of tables, regardless of how many legs they have. During the period between the filing of the patent application and its eventual issuance as a patent, the patentee has broad freedom to amend claims, with no explanation necessary. This period between filing and issuance, during which the PTO considers whether the application should be granted as a patent, averages about 32 months.

There is no legal limit to the number of original claims and amendments that can be filed. One important practical limitation on both, however, is cost. The PTO charges fees for both filing claims and repeatedly amending them (the first amendment is free). The result of the PTO fee structure is to generally encourage amendment in place of filing large numbers of original claims. The standard application fee of $1090 permits up to twenty original claims. Each additional claim costs $52. Thus filing large numbers of original claims quickly becomes an expensive proposition.

29 This comprises a filing fee ($330), a search fee ($540), and an examination fee ($220). For the schedule of fees, see 37 C.F.R. § 1.16 (2008).
30 37 C.F.R. § 1.16(i).
Amendment costs money also, but the fee structure is slightly more complicated. For every second round of amendment, the patentee must pay an additional fee of $810 (the first amendment is free, the second requires a fee, the third is again free, and so on). Each round of amendment can encompass the 20 claims of the original filing. This means that a patentee who wishes to try out various claims on the examiner is much better off running through them via amendment rather than filing them all at once. Running through 80 claims via amendment (file 20 originally, amend to the next 20, and so on) costs $1900; filing all 80 claims at once would cost $4210.

A second incentive to file fewer claims upfront (but more amendments later) is the recently imposed requirement of examination support documents (“ESD”). An application that contains more than 25 original claims must be accompanied by an ESD. Preparing an ESD requires the applicant to conduct a fairly onerous search of the prior art and then explain why his invention is a patentable advance over such preexisting art. The burdens and risks of filing an ESD are significant enough that some practitioners suggest that they should never be filed. The only way to file a large number of claims while avoiding the ESD requirement is to file claims serially, since serial amendments do not require an ESD even if the cumulative number of claims is very large.

Pre-issuance amendments are therefore an ubiquitous part of the current system.

2. Post-issuance amendment.

Once a patent is issued, it is somewhat more procedurally complicated to change the claims. The formal language of an issued claim can be changed only with a reissuance or reexamination, both of which carry conditions. All of the practical benefits of pre-issuance amendment can be secured, however, with a continuation application, with none of the downsides. A brief summary of these vehicles is helpful.

37 C.F.R. § 1.17(e) (fee for a request to continue examination after a second rejection).
33 37 C.F.R. § 1.75 (2008).
34 37 C.F.R. § 1.265 (2008)
36 72 Fed. Reg. 46716, 46721 (Aug. 21, 2007) (noting that, with two continuations, the applicant may file 75 cumulative claims without an ESD).
A reissue allows the holder of an issued patent to go back to the PTO and modify the claims, if there is a mistake of defect in the patent.37 “Mistake” and “defect” in this context is construed extremely generously. A patentee that obtained a patent claiming “a table with four legs” may go back and seek a patent on “a table with at least three legs”—there is no need to show that he made a typographical error or that he unconsciously put the word “four” into the claim.38 In fact, the patentee does not need to explain what the mistake or defect is at all.39 The only thing that is considered to be not a mistake is a prior intentional disavowal: that is, the PTO specifically asked “did you invent a table with three legs,” and the patentee previously answered “no,” and then later tries to claim a table with three legs.40

A reexamination is similar to a reissue in changing the claims; but is initiated differently. A reexamination is typically initiated by someone other than the patentee, because the third-party discovers new prior art that raises a substantial question as to the validity of the patent.41 In the example of a patent covering a table, someone may discover an old book describing a table before the patentee invented it, thereby potentially showing the patent is invalid. Once a reexamination is initiated, claim amendments may be made in the same way as in reissue proceedings and pre-issuance amendment.42 A patentee can also request reexamination of his own patent, but this is relatively rare.43

Patentees do not like to use reexamination and reissue to amend claims, for two reasons. First, patentees are limited in their ability to broaden claims during these procedures, that is, changing the claims to cover more things. Broadening reissue is permitted only if requested within two years of the initial patent issuing,44 and the patentee may not broaden claims at all in reexamination proceedings.45 Second,

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38 See In re Hounsfield, 699 F.2d 1320 (Fed. Cir. 1983) (no prior “intent to claim” requirement).
40 See Mentor Corp. v. Coloplast Inc., 998 F.2d 992 (Fed. Cir. 1993) (stating the “recapture” rule).
42 35 U.S.C. § 305 (2006) (“reexamination will be conducted according to the procedures established for initial examination”).
43 In 2008, there were 680 ex parte reexamination requests filed. Of these, 593 were filed by third-parties and 87 were filed by the patent owner. PTO Annual Report, supra at note 27, at 127.
reissue and reexamination are subject to “intervening rights.” As with
other methods of amendment, intervening rights exempts all the
products (i.e. the individual three-legged tables) made or sold prior to
the completion of a reissue or reexamination proceeding from damages
and injunction.46 Unique to intervening rights, however, is that courts
have discretion to protect competitors who made long-term
investments, such as a factory, thereby largely eliminating the
retroactive effect of amendment.47 This discretion takes shape in
judicial permission for competitors to continuing using a factory or
machine, without having to pay a royalty.48 The possibility of such
protection against retroactive effect means that patentees have less to
gain from reissue and reexamination.

A far more appealing avenue for a patentee is to seek the changes
through a continuation application.49 Continuation applications allow
the patentee to do everything that he can achieve with a reissue

47 See text accompanying notes 21–24, supra.
Such permission is not always granted. Compare Ashland Fire Brick Co. v.
Gen. Refractories Co., 27 F.2d 744, 746 (6th Cir. 1928) (permitting the
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 made 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); see also 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).
49 “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 later application that claims
priority to the originally filed application. A “divisional” application under 35
U.S.C. § 121 has the same effect but with claims directed to an ostensibly
separate invention. A “request for continued examination” under 35 U.S.C.
§ 132 continues prosecution of the same application, effectively as if a
continuation is filed but without a separate application. These are often
collectively referred to as “continuations” because “their policy effects are
indistinguishable.” Mark A. Lemley and Kimberly A. Moore, Ending Abuse of
application, but without the limit on claim broadening, and without intervening rights accruing to competitors.

A continuation application is essentially the filing of a second, identical, patent application at a later date. The first application is known as the “original” application and the second as its “continuation.” The continuation is treated for almost all purposes as if it were filed on the date of the original application. Thus, the patentee might file the original application on a table on January 1, 2000; and he may file a continuation application on February 1, 2003. As long as the specification of the two applications are identical and a notation is made that the 2003 application is a continuation, it will be treated as if it were filed on January 1, 2000.

This apparently simple device is incredibly useful to a patent applicant, because there is no limit to the number of continuation applications that can be filed, and there is no limit to the claim changing that can occur through a string of continuations. Moreover, the filing of a continuation does not prevent the original application from issuing. Thus, suppose that you file the original application in 2000, and file the first continuation in 2001 with 20 new claims as amendments. You can then file a second continuation in 2002 with another 20 claim amendments; and a third in 2003, and so on ad infinitum. Because an applicant can keep filing new continuations and new claims after old claims get rejected by the PTO, “it is impossible . . . to ever finally reject a patent application.”

The string of continuations leads to unlimited claim changing even after the first patent (or multiple patents) has issued. Say that the original application, filed in 2000, claims “a red wooden table with four legs,” and a patent is issued in 2001. This is quite a narrow claim and a competitor can easily avoid infringing the original patent by changing the color to blue. Seeing this, the patentee can use the continuation filed in 2002 to pursue a different claim: “a table with three or more legs, of any color.” The competitor who has just finished

50 35 U.S.C. § 120 (2006) (“An application for patent for an invention disclosed . . . in an application previously filed in the United States . . . shall have the same effect, as to such invention, as though filed on the date of the prior application.”).

51 The continuation must be filed while another application is pending. Thus, the first continuation must be filed with the original application is pending; the second continuation must be filed while the first continuation is pending; and so on. This creates a “string” of continuation that persists through the life of the patent, which is twenty years from the filing of the original application. 35 U.S.C. § 154 (2006).

52 Lemley & Moore, supra at note 49, at 64.
his factory for building blue tables suddenly becomes an infringer when the 2002 continuation issues as a patent. Ostensibly, the 2002 continuation will issue as a separate patent (and thus it does not literally “change” the original patent), but its practical effect is to supersede the original patent, since it has a broader claim. This practical effect arises because anything infringing the narrow claim will necessarily infringe the broader claim (all red tables are necessarily tables), and infringing one claim is the same legally as infringing a dozen.

The fact that the later patent (issued from a continuation) effectively supersedes the original patent means that a continuation can do everything that a reissue or reexamination can do, and more. First, there is no limit on broadening claims through a continuation—it can occur at any time and is not limited to two years. Second, there are no intervening rights for a continuation. The competitor who builds a factory to build blue tables must shut down the entire factory. What this really means is that the competitor will pay the patent owner a hefty royalty that reflects not the cost of any accused products made by the factory, but for the value of the factory itself. It is therefore not surprising that continuations are the method of choice for post-issuance claim amendment.

C. The Lax Limits on Claim Amendment

In addition to the unlimited number of amendments that may be filed, the substantive limits on claim amendment are lenient. In general, an amended claim simply has to satisfy the same criteria as an original claim. For most patents, the requirements of patentability boil down to having the subject-matter of the claim be an advance over what was previously in the public domain (known in patent parlance as the “prior art”), and also be properly disclosed in the specification.


54 See Tex. Instruments, Inc. v. USITC, 871 F.2d 1054, 1065 (Fed. Cir. 1989) (endorsing exclusion of competitor product by a continuation patent); Lemley & Moore, supra at note 49, at 109 (arguing for creation of intervening rights for continuations that broaden previous claims).


56 Lemley & Moore, supra at note 49, at 76-78 (describing use of continuations to change claims).

57 Other limitations on claims include that the claim must be directed to patentable subject-matter, which is broadly formulated as “anything under the sun made by man.” Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980).
As the Federal Circuit has concisely stated, a patentee “is entitled to claims as broad as the prior art and his disclosure will allow.”58 These limits exist in patent doctrine as the non-obviousness, enablement, and written description requirements.

It is important to emphasize that all three requirements apply to originally filed and amended claims. This means that there are effectively no particularized limits on amendment. A patentee can amend the original claim, and then amend the amended claim, and then amend the twice-amended claim. This is problematic because a patentee who places amendment upon amendment upon amendment—a chain of amendment without end—utterly frustrates the boundary function of a claim.

1. Prior art and the non-obviousness limitation.

The prior art in patent law is the sum of public knowledge prior to the patentee’s invention.59 It virtually goes without saying that a patentee should not be able to “remove existent knowledge from the public domain, or to restrict free access to materials already available.”60 So too a patentee may not claim something that, while not explicitly disclosed in prior art, is such an obvious variant that it was effectively part of the public domain.61 For example, if we already have metal doorknobs, it would require very little effort to construct clay doorknobs using the same technique, and thus neither are patentable.62

Protecting the prior art makes perfect sense. But this limitation alone would not be sufficient. There are many worthwhile things that are not obvious, such as a cure for AIDS, faster-than-light travel, and flying cars. A patent should not issue on any of these inventions unless the patentee provides a working disclosure of it. The enablement and written description requirements aim to tie the

The claimed invention must also be useful, which has also been broadly construed to encompass just about anything. See, e.g., Juicy Whip, Inc. v. Orange Bang, Inc., 185 F.3d 1364 (Fed. Cir. 1999).


59 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).

60 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.”).


patentee’s disclosure to society (in the specification) to his monopoly reward (in the claim).

2. The enablement requirement.

The primary nexus between a patentee’s claim and his contribution to society is provided by the enablement requirement. The enablement requirement mandates that the patentee’s specification (which cannot be changed after filing) should disclose how to make and use the claimed invention. The “claimed invention” means whatever is eventually claimed, whether in the original claim or as superseded by an amended claim.

The leading case on enablement is the *Incandescent Lamp Patent* case. Two inventors, named Sawyer and Man, created an incandescent lamp using carbonized paper, which did not work particularly well and was a commercial failure. They wrote a claim for all incandescent lamps using any “textile or fibrous material.” Several years after, Thomas Edison developed a much better lamp using bamboo, which was a textile or fibrous material as was carbonized paper. The Court struck down the broad claim, reasoning that Sawyer and Man’s contribution to society was limited to carbonized paper light bulbs, not all light bulbs made of any textile or fibrous material.

The enablement requirement also makes sense, since a patentee should not receive more than what he contributes to society in his specification disclosure. But this policy is unrelated to the unique harms of changing claims and the boundary function of patents. Enablement applies equally to original and amended claims, and does not limit claim amendment as such.

Another problem is that the enablement requirement is very difficult to apply in practice. This is because every invention can be accurately described at different levels of generality. Suppose that a patentee creates a table with four legs and painted blue. The “invention” can be described and claimed very specifically as “a blue

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63 *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384 (Fed. Cir. 1986).
64 159 U.S. 465 (1875).
65 *Id.* at 471.
66 *Id.* at 472-73.
68 See Burk & Lemley, *supra* at note 4, at 51 (arguing that there is no right level of abstraction when considering the related context of infringement).
table with four legs”; but it can also be accurately described and claimed very generally, simply as “a table.” The latter claim is much broader than the former claim—it covers all tables, including an antigravity table with no legs, while the narrow claim would not even cover a red table with four legs.

In such a situation, the patentee has clearly disclosed how to “make and use” a table. The problem is that he has not disclosed how to make and use every table. This a-versus-every dichotomy is hard to resolve. If the enablement test requires only a specimen be disclosed to support a broad claim over the genus, as some cases indicate, then it is absurdly easy to satisfy: building a four-legged table would support a claim encompassing all tables, including a future antigravity table. If the enablement test requires every specimen be disclosed or at least made obvious, as other cases indicate, then it is impossible to satisfy. Even taking a very narrow claim, such as “a blue table with four legs,” it is impossible disclose how to build a blue table using alloys yet to be discovered, or a tiny blue table with four legs the size of a few nanometers (note that both of these embodiments would infringe the claim if someone else later builds them). The cases on enablement thus become a confusing morass. The resulting uncertainty means that the enablement requirement does little to provide predictability in patent boundaries.

3. The written description requirement.

The test for written description was whether the patentee had “possession” of the claimed invention at the time of filing. Historically, the written description requirement functioned as a limitation on claim amendment, and was not applied to original claims. This was changed by the Federal Circuit’s decision in Regents of the University

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69 See Nichols v. Universal Pictures Corp., 45 F.2d 119, 121 (2d Cir. 1930) (describing the level of abstractions problem and stating “[n]obody has ever been able to fix that boundary, and nobody ever can”).

70 Spectra-Physics, Inc. v. Coherent, Inc., 827 F.2d 1524, 1533 (Fed. Cir. 1987) (“a broad claim can be enabled by disclosure of a single embodiment”); see Invitrogen Corp. v. Clontech Labs. Inc., 429 F.3d 1052, 1071 (Fed. Cir. 2005) (one method of making invention enough to enable).

71 Liebel-Flarsheim Co. v. Medrad, Inc., 481 F.3d 1371, 1380 (Fed. Cir. 2007); Automotive Techs. Int’l, Inc. v. BMW of North America, Inc., 501 F.3d 1274, 1285 (Fed. Cir. 2007) (“We also reject ATI’s argument that because the specification enables one mode of practicing the invention . . . , the enablement requirement is satisfied.”).


73 In re Koller, 613 F.2d 819, 823 (C.C.P.A. 1980) (“original claims constitute their own description”).
of California v. Eli Lilly & Co., which held that the written description requirement applied equally to original claims.

After Eli Lilly, written description has become practically coextensive with the enablement test. After all, “possession” of an invention is indistinguishable from “enabling” someone to make and use that invention, and the case law does little to distinguish between these concepts. This means that the written description doctrine’s “possession” test is infected with the same level of generalities problem as the test for enablement. Suppose the patentee creates a table with four legs and painted blue. This means he has possession of a table, but not possession of every table. If the patentee files a claim for “a table”—which really means “every table” and would cover future antigravity tables—does the claim satisfy the written description requirement? Like enablement, the cases on written description are in hopeless conflict over this issue.

To the extent that a meaningful test for written description can be discerned, it is usually applied in a lenient manner. A good example of such leniency is Vas-Cath, Inc. v. Mahurkar. In this case, the Federal Circuit held that a set of drawings—with no description whatsoever—perfectly embodied the later claims, despite a district court having noted that the drawings depicted numerous features and pointed to no

74 119 F.3d 1559 (Fed. Cir. 1997).
75 Id. at 1566.
77 See Moba, B.V. v. Diamond Automation, Inc., 325 F.3d 1306, 1326 (Fed. Cir. 2003) (Rader, J., concurring) (“to enable is to show possession, and to show possession is to enable”); Timothy R. Holbrook, Possession in Patent Law, 59 SMU L. Rev. 123, 146-47 (2006) (arguing that enablement should be conceptualized as possession).
79 See Lizardtech, Inc. v. Earth Resource Mapping, Inc., 433 F.3d 1373, 1376 (Fed. Cir. 2006) (Rader, J., dissenting) (“This court’s written description jurisprudence has become opaque to the point of obscuring other areas of this court’s law.”).
81 935 F.2d 1555 (Fed. Cir. 1991).
particular aspect as being novel. The fact that drawings depicting numerous features allow a single feature to be later claimed meets its logical extreme in a laundry list disclosure. One such laundry list occurred in Snitzer v. Etzel, where the patentee described a formula that resulted in eighty-seven billion different ions, later claiming a single such ion. The court upheld that later claim.

Not all cases are so extreme, but the above examples suffice to illustrate that the written description requirement is a weak and unreliable limit on claims generally. After Eli Lilly, it is also unclear whether any patent law doctrine uniquely limits claim amendment, even though claim amendments cause unique harms by changing the boundaries of a patent, frustrating their definition and obscuring notice.

D. The Limit of Amendment as the True Boundary.

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

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. In the long run, a patentee can claim anything that is “possessed” in the specification and not rendered obvious by the prior art:

Long-Run Coverage = Specification – Prior Art

When considering the boundary of a patent, however, the patentee’s rights today matter much less than his rights tomorrow. A competitor

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82 Id. at 1565.
83 See 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) (“it is relatively simple to go from a structural formula reading on thousands of chemical compounds to a printout naming the compounds individually”).
84 465 F.2d 899, 902 (C.C.P.A. 1972).
85 Id. at 903.
86 Id.
87 Cf. In re Ruschig, 379 F.2d 990, 994-95 (C.C.P.A. 1967) (rejecting a laundry list, but still finding that “[w]e have a specification which describes appellants' invention”).
88 Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (describing this as a “bedrock principle”).
who is about to invest millions of dollars building a factory making three-legged tables for twenty years cares little about whether he may sell those tables today—he cares more about whether he will be able to sell those tables for the next twenty years. And the answer to that question depends not on whether the patent claim today covers three-legged tables; but on whether the claim can be changed to cover them later.

In this way, the limits on claim changing serve as the real long-run boundaries of a patent, in so far as only these limits provide a safe harbor for competitors from the patentee’s long-term ability to exclude them. A competitor has comfort only if a patentee is permanently precluded from covering a certain product—if the patentee cannot change the patent to claim it later. Notably, the PTO is already forced to conduct searches based on the scope of possible amendment, treating this as the patent boundary.90 The only stable limit on patent rights is the limit of amendment—whatever is already covered by prior art or is inadequately disclosed by the specification. In direct contradiction to frequent statements by courts,91 it is the specification (along with prior art), not the claims, that defines the patentee’s rights.

The fact that the prior art and the specification really define the patentee’s rights is highly problematic. As mentioned earlier, claims are supposed to provide simple and certain answers to the determination of whether something will be covered by the patent, so that competitors may safely sell—and the public can safely buy—a product that is not covered. But determining whether a product is part of the prior art, or (in)adequately described by the specification, is neither easy nor certain. It is difficult to determine the content of prior art because the universe of prior art is extraordinarily vast,92 and it is difficult to determine what is enabled by a specification because the

90 United States Patent and Trademark Office, Manual of Patent Examining Procedure § 904.03 (8th ed. 2001) [hereinafter “MPEP”] (“It is normally not enough that references be selected to meet only the terms of the claims alone . . . the search should, insofar as possible, also cover all subject matter which the examiner reasonably anticipates might be incorporated into applicant's amendment.”).

91 See, e.g., Milcor Steel Co. v. George A. Fuller Co., 316 U.S. 143, 145-46 (1942) (“it is these claims, not the specifications, that afford the measure of the grant to the patentee”); Am. Permahedge, Inc. v. Barcana, Inc., 105 F.3d 1441, 1444 (Fed. Cir. 1997) (“Claims, not the specification embodiments, define the scope of the protection.”).

92 See, e.g., In re Hall, 781 F.2d 897, 900 (Fed. Cir. 1986) (single thesis in a university library is prior art); In re Wyer, 655 F.2d 221 (C.C.P.A. 1981) (patent application kept only on microfilm in the Australian patent office is prior art).
specification is long, full of technical language, and mixes the old with the new. Nor, even supposing that an exhaustive inquiry of both the specification and the prior art is made—a difficult and expensive exercise—can anyone truly be certain that the conclusion is correct because the legal doctrines themselves are unclear. The scope of the prior art reflected by the obviousness doctrine is notoriously difficult to apply,93 and the case law surrounding the enablement and written description doctrines are fundamentally irreconcilable.94

It is for all these reasons—that determining infringement by looking to the specification and the prior art is difficult, expensive, and uncertain—that the claiming requirement arose in the first place. But the fact that claims can be changed forces everyone (patentees, competitors, their customers, the PTO’s examiners, and the courts) to once again look to the specification and prior art to determine the boundary, undermining the very point of having claims in the first place. The next Part discusses the problems of this regime.

II. THE ECONOMICS OF CHANGING CLAIMS

A. The Functions of Written Claims

1. A history of claiming.

In asking what functions the patent claim serves, it is helpful to consider a regime where patent claims do not exist, and the problems that would arise. Such an example is easily available, because patent claims are a relatively recent development. Prior to 1809, there were no patent claims.95 Instead, patent infringement was determined by comparing the embodiment of the patentee’s invention—such as a physical four-legged table—with the accused product, using the criterion of whether the two were “substantially, in their principles and mode of operation, like.”96

This vague test of “substantial similarity” was unhelpful to everyone. For patentees, it carried the risk that juries would be misled by the superficial differences between two devices.97 For example, a stone wheel and a rubber tire do not look alike, even if they operate in by the

93 Harries v. Air King Prods. Co., 183 F.2d 158, 162 (2d Cir. 1950) (describing the obviousness standard as “as fugitive, impalpable, wayward, and vague a phantom as exists in the whole paraphernalia of legal concepts”).
94 See Part I.C.2.
same principles, nor does a desk with a set of drawers look like a dining table with wheels at the bottom. For accused infringers, it carried the risk that patentees would be rewarded with non-innovative parts of a complex device, and it would be impossible to determine ahead of time what was being patented versus what was already known.98

An example of these problems is Evans v. Eaton.99 In Evans, the patent described a “Hopperboy” machine with some improvements. Obviously, there were no claims.100 The problem is that it was unclear whether the “invention’ was the entire machine or some sub-part.101 The Court was troubled by the fact that it was difficult to separate the supposedly inventive “improvement” from the machine as a whole, since the entire machine was described by the specification, and the patent was thus “mixing up the new and old”:

[C]an the doctrine . . . be maintained, that no specification of an improvement is necessary in the patent, and that it is sufficient if it be made out and shown at the trial, or may be established by comparing the machine specified in the patent with former machines in use? . . . How can that be a sufficient specification of an improvement in a machine which does not distinguish what the improvement is nor state in what it consists nor how far the invention extends? Which . . . , mixing up the new and old, [ ] does not in the slightest degree explain what is the nature or limit of the improvement which the party claims as his own? . . . [W]e are of opinion that [the patentee] ought to describe what his own improvement is, and to limit his patent to such improvement.102

From Evans and similar cases, the requirement of explicit claims arose,103 and was included in the Patent Act of 1836.104 Explicit claims

100 Oliver Evans’ patent was issued in 1808, before the development of claims. See Evans v. Eaton, 16 U.S. (3 Wheat.) 454, 457 & n.2 (1818).
101 20 U.S. at 428.
102 Id. at 433-35.
103 Woodward, supra at note 95, at 759 (“As a result of such pronouncements, the practice of appending statements of claim. . . became general.”).
104 Patent Act of 1836, § 6, ch. 357, 5 Stat. 117 (requiring a patentee “particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery”).
provided several important advantages over the prior “substantial similarity” test.

First, claims allowed the invention to be determined with more certainty. Patentees could be less concerned that juries would be misled by insubstantial differences in form or appearance. Accused infringers could be sure of the exact component that was being patented, and copy the unpatented components of a machine.

Second, claims allowed the inventive aspect of the specification embodiment to be determined more easily. As the patentee argued in *Evans*, it was theoretically possible to determine the inventive component of his Hopperboy machine, just by “comparing the machine specified in the patent with former machines in use.”105 The obvious problem with that method would have been its prohibitive cost, since it would have required an exhaustive comparison with all other prior machines. By requiring the patentee to describe the improvement upfront through claims, the Court made this determination easier.

Third, claims revealed important information possessed only by the patentee. As the Court opined, the patentee “ought to describe what his own improvement is, and to limit his patent to such improvement.”106 It must have appeared at least mildly disingenuous for the patentee—the supposed inventor of the improvement—to argue that he did not know what his own improvement was but it could be determined by subtracting out all the components that existed in prior machines that other people had built. In economic parlance, the patentee has an information advantage in knowing what his own invention is,107 and it is appropriate to force him to disclose this in claims.

These three advantages of claims over a “substantial similarity” test are still relevant today. The ability of claims to allow easy, cheap, and certain determination of the scope of protection by others is known as the “notice” function of claims.108 The ability of claims to force the patentee to define his own invention is known as the “definitional”

105 *Evans*, 20 U.S. at 433.
106 Id. at 435.
function of claims. Both are integral to the role of claims as patent boundaries. As will be seen later, both are undermined by the ability to change claims.

2. Claims give notice of permissible limits.

The primary function attributed to modern claims is the “notice” function. By this, courts mean that claims provide a manner for potential competitors to determine what products would infringe ahead of time. Since competitors have access to issued claims, they can create products that fall outside those claims and thereby not infringe patents.

Although it is frequently emphasized that the claims provide public notice of the limits of the patentee’s monopoly, it is important to note that public access is not the heart of the notice function of claims. To be sure, issued claims are publicly accessible, and without such access claims would serve no notice function at all. But the public could also discern the permissible scope of a patentee’s invention during the pre-claiming era. All that a potential competitor need to do would be to take the machine described by the patent specification, and “compare[ ] the machine specified in the patent with former machines in use.” In other words, a competitor could read the patent specification, figure out what is enabled and described, and then subtract from that everything already in the prior art, and be left with the patent’s limits—the broadest potential coverage of the patent. Both the patent specification and the prior art are publicly accessible to potential competitors.

The true advantage of claims in providing public notice is that they achieve this notice of patent limits more cheaply and with better certainty than the specification-minus-prior-art method. Although

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109 White v. Dunbar, 119 U.S. 47 (1886) (“The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is.” (emphasis added)).

110 PSC Computer Prods., Inc. v. Foxconn Int’l, Inc., 355 F.3d 1353, 1359 (Fed. Cir. 2004) (“claims serve the important notice function of informing the public that anyone who makes, uses, or sells the claimed invention infringes the patent”).


112 Evans, 20 U.S. at 433.


the prior art is publicly available, it is very difficult and expensive for a competitor to exhaustively search; while a claim can be cheaply accessed on the PTO website or on paper. Although the specification can be analyzed by a competitor, it is inherently uncertain because it mixes the old with the new, is full of complex jargon and disclosures, and is very long; while a claim is supposed to be a crisp single sentence. And analyzing the specification and prior art using the legal doctrines of enablement, written description and obviousness causes great uncertainty because the legal doctrines are amorphous standards; while each claim is supposed to be a bright-line rule.

The cost and certainty advantage of claims (versus a detailed analysis of the specification and prior art) only holds, however, if claims impose meaningful limitations on patentees and truly protect competitors. Claims that are easily changed with retroactive effect provide no such protection: a competitor who relies on claims falls squarely into a trap when the amended claim issues and reads on his product, forcing him to abandon his newly built factory. The wily competitor should either spend the money to analyze the specification and prior art; or simply give up and treat patent infringement as a cost of doing business. Overwhelmingly, it appears that competitors in practice choose the latter option and ignore patents until sued, in the belief that paying infringement damages ex post is cheaper than analyzing patents ex ante. Neither option, of course, is a desirable outcome.

3. Claims place definitional responsibility on the patentee.

A second function served by claims is known as the “definitional” function. Primarily, this refers simply to the doctrine that claims are supposed to define the boundaries of the patent, which makes this function almost indistinguishable from the notice function. Claim offer definition, however, in that they require the patentee to detail his own invention. As the Supreme Court said in the famous case of Merrill

115 Keystone Bridge Co. v. Phoenix Iron Co., 95 U.S. 274, 278 (1877) (claims "reliev[ed] the courts from the duty of ascertaining the exact invention of the patentee by inference and conjecture, derived from a laborious examination of previous inventions, and a comparison thereof with that claimed by him").

116 MPEP, supra at note 90, at § 608.01(m) (requiring single sentence claims).


118 Christopher A. Cotropia, Patent Claim Interpretation Methodologies and Their Claim Scope Paradigms, 47 Wm. & Mary L. Rev. 49, 65 (2005) (“Patent claims perform another function; they actually establish the scope of exclusivity afforded to an issued patent.”).

119 Evans, 20 U.S. at 435.
v. Yeomans, 120 “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.”121

The fact that claims cover his own invention gives the patentee an informational advantage. Better than anyone else, the patentee should know what he actually invented, at the time he filed the patent application:

[T]he patentee is conclusively presumed to have known what he invented or discovered, better than did any one else, at the time he applied for a patent. This is true, even though subsequent students may perceive . . . that he disclosed methods, means, or processes having capabilities surpassing the inventor’s dreams at the time attempt was made to put achievements into words.122

Claims therefore act as an “information forcing” mechanism, to encourage patentees to disclose their own understanding of the invention, early on at the time of filing.123 The fact that original claims are filed with the patent application means that original claims are uncorrupted by later information. Original claims are more “honest” than later claims in describing what the patentee really invented, in the same way that early testimony is usually regarded as more honest than later contradictory testimony from the same witness.124 The policy of liberal amendment, however, permits the later claim to control.

B. The Definition Function and Patentee Incentives

One important motivation for patentees to amend claims is to incorporate later discovered information. A good example of this phenomenon is Crown Cork & Seal Co. v. Ferdinand Gutmann Co.125 In Crown Cork, the patentee Warth filed an initial patent application on a process for making bottle caps. The patentee emphasized and claimed the benefit of using simultaneous heat and pressure to seal the

120 94 U.S. 568 (1877).
121 Id. at 573-74.
122 Kintner v. Atlantic Communication Co., 240 F. 716, 717 (2d Cir. 1917).
124 Mack v. United States, 814 F.2d 120, 124 (2d Cir. 1987) (“a party’s affidavit which contradicts his own prior deposition testimony should be disregarded”).
125 304 U.S. 159 (1938).
cap. As an aside, the patent noted that it may be desirable to “preheat” the assembled crown. Wrath initially thought that preheating was not worth protecting—he cancelled claims that would have covered it. Subsequently, however, a competitor Johnson obtained a patent on preheated caps. As a lower court noted, “had it not been for this competitor, Warth might never have considered the subject [of preheating] worth claiming as an invention.”

The fact that a competitor made preheating bottle caps commercially valuable induced Warth to resurrect his claims on preheating through a continuation. Warth amended his claims to become exact copies of Johnson’s. Thus a priority dispute evolved between Warth, who first thought of the feature but attached no importance to it, and Johnson, who was later in time, but appreciated the value of pre-heating. In this contest between inventors, the Supreme Court awarded the patent to Warth. Johnson therefore received nothing from the patent system for his efforts; instead he became an infringer.

The use of retroactive amendment to capture inventions whose commercial value becomes apparent later through the efforts of others is widely seen as unfair. Robert Merges has dubbed this practice “misappropriation by amendment.” The essential defect is that, although the patentee must disclose the later-claimed invention in some form to sustain the amendment, the written description requirement allows this initial disclosure to be vague, cursory, and buried within a laundry list. It is Johnson who really contributed the idea of using pre-heating to society, since without Johnson it is highly unlikely that anyone (least of all Warth) would have bothered to notice a stray line buried in a patent specification sitting among millions of issued patents. Given retroactive claim amendment,
however, it is Warth who receives all the reward, and Johnson who pays the penalty.

To say that the result is “unfair,” however, lacks rigor. Patent holders have a different view of the equities. After all, the patentee was the first person to write the feature down on paper—thus they were the first “inventor” of the later claimed feature in some sense. Patentees often have no idea whether they invented anything valuable when filing for patents,\footnote{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).} and thus a wait-and-see position in refining claims to match market developments helps patentees focus resources on the most valuable inventions. A court sympathetic to patentees can easily see omissions in original claims as standard patent prosecution practice,\footnote{In re Wilder, 736 F.2d 1516, 1519 (Fed. Cir. 1984) (“failure to appreciate the full scope of the invention is one of the most common sources of defects in patents”).} while regarding competitors who rely on such omissions as brazen pirates who deserve no sympathy (though it is by no means clear that Johnson or many other infringers actually \textit{copied} the invention by examining the patent).\footnote{Grant v. Raymond, 31 U.S. 218, 243 (1832) (authorizing reissue because defects in a patent are unlikely “to be perceived by any but those who examine it for the purpose of pirating the invention”).} Because unfairness is in the eyes of the beholder, and following the spirit of \textit{Crown Cork}, the Federal Circuit has strongly \textit{endorsed} the practice of using retroactive amendment to capture new information:

\begin{quote}
[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; \textit{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.\footnote{Kingsdown Medical Consultants, Ltd. v. Hollister, Inc., 863 F.2d 867, 874 (Fed. Cir. 1988) (\textit{en banc}) (emphasis added).}
\end{quote}

A more concrete way of approaching the problem, beside the simple appeal to fairness, is from patent law’s economic purpose. Patents
exist to “promote the progress of . . . the useful arts,” a mandate that has made this area of law particularly well-suited to economic and utilitarian analysis. The question is then whether allowing claim amendments that capture later insights promotes the incentive of patentees to invent and disclose their discoveries, as compared to the cost of that incentive on society.

Allowing patentees to capture new insights by competitors increases their return on the patent. All else being equal, this should increase the incentive to invent and disclose. The question by how much, and the answer is very little, after considering the difference in timing and risk discount rates. On the other hand, increasing the patentee’s return on a patent also increases the monopoly cost on society and reduces the reward to legitimate competitors. As mentioned before, Johnson received nothing in return for making pre-heating well-known an valuable—instead he had to pay Warth—and this surely discourages others from following Johnson’s footsteps. The costs of claim amendment and captured insights, therefore, can be very great. As discussed below, the benefits and costs of claim amendment accrue in different ways, resulting in a disparity between them.

1. Unequal discounting and patent incentives versus cost.

The standard economic model of patents holds that patents provide an incentive to invent and disclose some useful product or process by providing a time-limited monopoly over the same invention. The monopoly thus creates both a benefit and corresponding cost. A very lucrative monopoly (e.g. Edison’s eventual monopoly over the incandescent lamp) confers strong incentive benefits, and imposes large societal costs, since everyone must pay inflated prices to the patentee. The benefits and costs of the patent monopoly usually go hand-in-hand. A $100 monopoly profit paid to the patentee creates the

141 See Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480-81 (1974) ("The stated objective of the Constitution . . . is to 'promote the Progress of Science and useful Arts.' The patent laws . . . have a positive effect on society . . . by way of increased employment and better lives for our citizens.").
144 Giles S. Rich, Infringement Under Section 271 of the Patent Act of 1952, 35 J. Pat. Office Soc’y 476, 479 (1953) ("a patent is a monopoly because its only value as an incentive depends upon securing its owner monopoly power").
incentive, but comes out of consumer pockets with a resulting deadweight loss. But there are two important features that affect this link between benefit and cost. First, the incentive is directed to private individuals, in that they affect individual patentees, but the costs are public, in that they are borne by the entire society in paying inflated prices. Second, the incentive effect occurs at distinct points in time. The patentee must make an upfront investment in research and development early, and reaps the monopoly profits only later. The process is affected by uncertainty, and the patentee must make research investment based on expected monopoly profits. In economic terms, he must discount the future revenue stream by an appropriate adjustment for risk.

Thus, suppose in the year 2019, a patent on an invention is expected to yield a $100 monopoly profit. A putative inventor, however, has to make a decision whether to pursue the invention in 2009. To the inventor in 2009, the prospect of $100 in ten years is worth much less than $100 today. In addition to the time value of money, there is the possibility that the expected $100 might never materialize at all. The research and development efforts may fail; or the invention may not be as successfully as one initially thought. Because people are assumed to be risk averse, the inventor today will not spend $100 in research and development. At a 10% risk discount rate, he will spend only $38.56.

The relevant time-point for the incentive benefit of a patent is the time of filing, because that is when the patentee makes his decisions. The investment to research a patentable invention necessarily occurs before filing a patent on it, and the decision to disclose that invention

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146 Or it may perform unexpectedly better and be more valuable than initially expected. The aversion to variance, not simple downside loss, is the economic concept of risk. See Milton Friedman & L.J. Savage, The Utility Analysis of Choices Involving Risk, 56 J. Pol. Econ. 279 (1948).


is made by filing. Filing thus ends the incentive benefit of a patent. The revenue stream that supports this incentive, however, occurs after issuance, when the patent becomes enforceable and generates monopoly profits. The discount, therefore, must be applied throughout this period.

The fact that benefits must be reduced by a risk-discount, itself, cannot be a strong objection to patentee appropriation of later competitor innovations and insights. All patent outcomes are subject to some level of uncertainty, as are other property rights. If the discounting of incentive benefits is a problem, it is a problem that occurs throughout all of intellectual property law.

The problem is not that the patentee’s rewards from capturing future competitor insights must be discounted for risk, but that the discount is particularly high. The more uncertain a particular outcome at the relevant decision-point, the higher the risk discount rate. At the time of patent filing, future insights such as the commercial success of a feature are by definition unknown to the patentee. To the extent that the patentee already believes a feature will become commercially successful, or that the patentee intends to exploit himself, he will include it in a original claim. Thus, the developments subject to claim amendment are necessarily those that are unforeseen and uncertain.

The lure of permitting claim amendment to an inventor at the point of filing thus reduces to this vague promise: “If someone else comes up with anything good, and if it vaguely resembles what is in your patent specification, we will give you a chance to change your claim to cover...

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149 Alexander Milburn Co. v. Davis-Bournonville Co., 270 U.S. 390, 401 (1926) (commenting that, upon filing, the patentee had “done all that he could do to make his description public”).


153 See 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, 1993 (2005) (“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.”).
it.” 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, due to its inherent unpredictability as a future event.

To be sure, even a vague and speculative promise of future benefit will have some pre-filing incentive effects. But this incentive is very small after risk discounting, and entirely disproportionate to the monopoly cost incurred. Society gets very little pre-filing incentive bang for the later monopoly cost buck.

For a fair comparison, the relevant cost must be discounted too. The fact that the patentee can expect a $100 monopoly profit in 2019 requires that the same profit be paid by consumers. Even a certain cost of $100 in ten years is not worth that amount today—we can invest $61.39 in a bank at 5% interest for ten years, and be virtually guaranteed to have $100 to pay the cost when it arises.

The difference—$38.56 in benefit versus $61.39 in cost—is created by different rates of discounting. The lower discounting of costs arises because the costs of the patent system are borne socially—reducing consumer welfare for society as a whole. This social cost aspect leads to a lower discount rate. For society as a whole, there is a large number of patentees, a large number of competitors, and a large

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154 An important assumption underlying this analysis is that inventors regard a monopoly with a defined scope as more predictable than one with undefined scope. Of course, even a defined monopoly over a particular set of embodiments (e.g. all tables) has considerable commercial uncertainty (e.g. it is unknown whether tables will sell), so the patentee’s monetary return is always uncertain. The analysis holds, however, so long as the uncertainty is reduced.

155 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”).


157 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 might be discounted at different rates).

158 The economic harm of the $100 monopoly profit is the deadweight loss created by reducing output. This deadweight loss is generally proportionate to, but not the same as, the monopoly profit. The example is a simplification.
number of consumers; the law of large numbers allows us to consider this average costs of the patent system to be a virtual certainty. This cost includes the cost of permitting claim amendments that misappropriate future competitor insights, since some competitors of some patentees will surely have insights to appropriate (for each individual patentee, the uncertainty is whether his particular competitors will have insights, which is much less certain). The monopoly costs of claim amendment, as a feature of the patent system, is therefore subject to the low social discount rate, usually considered to be the risk-free rate.159

To illustrate the difference between public and private discounting, suppose that we have a society with 100 patentees each holding one patent, and 100 consumers. Of the 100 patents, one single patent will strike the jackpot through an amendment, resulting in a $100 monopoly profit, and each consumer will pay $1 to that lucky patentee. For each patentee, the average value of the jackpot is $1 ($100 × 1%); but the risk-adjusted value is less than $1 due to patentee risk aversion. For each consumer, the cost is a certain $1, and no risk discounting applies because the eventuality is certain (the uncertainty is to whom the $1 will be paid, for which consumers do not care). The difference in private and social risk discounting thus creates a disparity between incentive benefit and cost.

The problem of appropriating later-developed competitor insights is that the inherent uncertainty of post-filing events magnifies this discount rate differential. For each individual patentee, the pre-filing anticipated benefit of appropriating competitor innovation is minimal, since it is grossly uncertain whether his competitors will any insights worth taking. For society as a whole, however, it is almost certain that some competitor to some patentee will have insights that are later going to be misappropriated, and the average cost of claim amendment is therefore subject to discounting at a much lower rate.

2. The problem as applied to narrowing amendments.

Unforeseeable developments that create high discount rates are not limited to competitor insights. New technological contexts, the development of new products, and unforeseen commercial value is common with the passage of time. A recent example is the development of the internet giving unforeseen windfalls to many patents on old networking technology. The very fact of claim amendment tends to suggest that it attempts to react to something unforeseen. After all, if the patentee had foreseen a particular

development, he would have attempted to account for it through an original claim—at least if the expected value of the future development was worth more than the small cost of adding a marginal claim.

The fact of unforeseeability means that the patentee’s incentive at filing for capturing unexpected later developments is small, while the social costs remain large. Indeed, capturing the benefit of an unforeseen later development is the classic definition of a windfall.

One common category of claim amendment, probably the most common and important, is an amendment to avoid unknown prior art that is discovered after filing. This category raises the same problem of giving patentees undue windfalls, just as when they appropriate later developed competitor insights. The key understanding is that although prior art necessarily exists before filing (since it is prior art), the patentee’s knowledge of it almost always occurs after filing. Thus, the discovery of unforeseen prior art is post-filing information that does not meaningfully contribute to pre-filing incentives.

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. The features emphasized by a claim amendment are likely to be those features that were originally thought to matter little, but acquire new significance after the unexpected discovery of new prior art. For example, the patentee may have initially claimed to have invented the computer mouse. Upon discovering that a one-button computer mouse already exists, however, the patentee may change his claim, to now claim having invented a two-button computer mouse. This newfound emphasis on “two-button” mice raises the same windfall concerns.

The twist is that a patentee seeking to amend his claims to avoid prior art will usually seek to narrow the existing claim to cover fewer things, in particular to omit the particular prior art device, such as a change from covering all mice to covering just two-button mice. This is in contrast to amendments trying to cover competitor insights, which usually seek to broaden the existing claim to cover more things. Whether an amendment is broadening or narrowing the claim,

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160 Meurer & Nard, supra at note 153, 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”); see also Shyamkrishna Balganesh, Foreseeability and Copyright Incentives, 122 Harv. L. Rev. (forthcoming 2009) (applying similar analysis to copyright law).
161 Parchomovsky, Siegelman & Thel, supra at note 9, at 756-57 (defining windfalls as unforeseeable gains).
however, the effect is expand the patent monopoly and its costs. A narrowed claim to avoid prior art has broadening effect and cost because, without the narrowing amendment, the claim would be invalid.\textsuperscript{162} An invalid claim has no scope at all.\textsuperscript{163} A narrowing amendment thus increases patent scope and monopoly cost, from zero to the “narrower” amended scope.

C. Risk of Drafting Mistakes and Efficient Allocation

A key assumption underlying my analysis in the previous section is that if a patentee had foreseen a particular development at the time of filing, he would have incorporated that development into an original claim, at least if the development was perceived as minimally valuable. One obvious response is that the patentee may very well have attempted to do so—the original claim was simply badly drafted. After all, drafting good claim language is notoriously difficult: changing a single word can drastically affect the scope of any particular claim.\textsuperscript{164} Therefore, the reasoning goes, claim amendments should be liberally permitted to allow rectifying mistakes in articulating what the patentee foresaw.

There seems little doubt that claim drafting mistakes do happen. By claim drafting “mistake” in this section, I mean the failure to cover what the patentee had foreseen at filing, not a failed attempt to capture the unforeseen. A good example of likely mistake is \textit{Winans v. Denmead}.\textsuperscript{165} In \textit{Winans}, the patentee invented coal cars that, by virtue of a circular shape, evenly distributed weight across the whole of the body of the car.\textsuperscript{166} The patentee drafted a claim that stated:

\begin{quote}
What I claim as my invention, and desire to secure by letters patent, is making the body of a car for the transportation of coal &c., in the form of a frustum of a cone, substantially as herein described, whereby the force exerted by the weight of the load presses equally in all directions, and does not tend to change the form thereof, so that every part resists its equal proportion . . . \textsuperscript{167}
\end{quote}

\begin{flushright}
\url{162 Festo Corp. v. Shoketsu Kinzoku Kabushiki Co., Ltd., 535 U.S. 722, 723 (2002) (noting that amendment is taken as a concession of invalidity of prior claim).}
\url{163 Richdel, Inc. v. Sunspool Corp., 714 F.2d 1573, 1579 (Fed. Cir. 1983) ("An invalid patent cannot be infringed.").}
\url{164 Lichtman, supra at note 19, at 2016.}
\url{165 56 U.S. (15 How.) 330 (1853).}
\url{166 Id. at 339.}
\url{167 Id. at 342 (emphasis added).}
\end{flushright}
As the context of the claim makes clear, the emphasis of the invention was on the principle of even distribution of weight. The patentee, however, chose to use the word “cone” to describe the shape of his car. A later infringer then copied the design, but used an octagonal coal car instead of a perfectly circular one.\textsuperscript{168} Based on any fair reading of the patentee’s original claim, we can safely say that the intent was to claim any shape that utilized the principle of even weight distribution, including a variation that utilized octagons instead of perfect circles. The inclusion of the word “cone” was a mistake.

The issue is whether the ease of making claim drafting mistakes should necessarily mean that they be rectified through claim amendment. Here, there are competing fairness paradigms. The fact that the patentee makes a claim-drafting mistake, and a competitor creates a product that falls just outside the literal claim due to the mistake (e.g. creates an octagon instead of a circle), is quite common. Two schools of thought have developed. According to one view, the accused infringer in such cases is simply a pirate who exploits a minor error, and claim amendment should be liberally permitted. The Supreme Court’s decision in \textit{Grant v. Raymond} aptly illustrates this “anti-pirate” view:

\begin{quote}
An objection [to later amendment] much relied on is that after the invention has been brought into general use, those skilled in the art or science with which it is connected, perceiving the variance between the [claim] and the [accused] 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 new patent would retroact 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 [original claim] 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 favor.\textsuperscript{169}
\end{quote}

Another view of the equities, however, holds that competitors are doing precisely what we would hope. The accused infringer has read the patent, understood its claims, and made a product that does not infringe the claim. It is the same thing, only stated in different ways, to say that the competitor is “exploiting a minor loophole” versus

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\begin{itemize}
  \item \textsuperscript{168} \textit{Id.} at 345.
  \item \textsuperscript{169} \textit{Grant v. Raymond}, 31 U.S. (6 Pet.) 218 (1832).
\end{itemize}
“relying on the notice function of the claim.” The Supreme Court’s decision in *Sontag Chain Stores Co. v. National Nut Co.* is a concise statement of the “pro-competitor” view:

[T]he claims of the original patent were limited as to the form of conveyor. . . . [E]xpressly appreciating its limited character, indeed, being governed therein by the advice of patent counsel, the defendant built a noninfringing brick machine . . . , at a substantial expense, and put them into commercial use on a large scale by extensively selling their product . . . .

The two lines of cases are fundamentally irreconcilable in spirit. In *Winans*, the original claim is limited as to the form of the car—as a cone—and the competitor exploits this limitation by constructing a non-infringing car. The Court condemns the competitor as a pirate. In *Sontag*, the original claim is limited as to the form of the conveyor, and the competitor exploits this limitation by constructing a non-infringing brick machine. The Court applauds this reliance on claims and, in addition to shielding the competitor from preexisting liability, awards the competitor with a continuing right to use the brick machine to make more bricks.

Nor is it useful to distinguish the cases based on the “substantiality” of the difference between a patentee’s claim and the competitor’s device. The competitor’s device is always substantially different in the only way that matters—it does not meet an element of the claim language. As the courts have repeatedly emphasized, “there is no legally recognizable or protected ‘essential’ element, gist or ‘heart’ of” a claim. Every word in a claim is deemed to matter, and to label a particular element to be a “minor mistake” instead of a significant one is just that: a conclusory label. Analytically, it is almost impossible to discern the substantiality of a claim drafting mistake.

170 310 U.S. 281, 294-95 (1940) (quoting *Ashland Fire Brick Co. v. Gen. Refractories Co.*, 27 F.2d 744, 745-46 (6th Cir. 1928)).
171 *Winans*, 56 U.S. at 344.
172 *Sontag*, 310 U.S. at 295.
173 *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 36 (1997) (“one wonders however to distinguish between the intentional copyist making minor changes to lower the risk of legal action and the incremental innovator designing around the claims, yet seeking to capture as much as is permissible of the patented advance”).
The core dilemma boils down to this: Claim drafting mistakes will be made, and they will cause a loss. This loss is of the patentee’s foreseen monopoly profits, which comes from excluding competitors, and either the patentee or competitor must be made to bear this loss. If the patentee is permitted to amend his claim to fix the mistake, then the competitor who relied on the patent claim will be made to bear the loss by paying royalties, reducing competitor incentive to rely on claims and create non-infringing designs. If the patentee is not permitted to amend his claim, then the patentee will bear the loss by having his legitimately expected monopoly dissipated, with reduced incentives to invent. Both the patentee and the competitor have self-serving appeals to fairness in why they should not bear the loss. A more solid foundation to analyze the problem, aside from competing appeals to fairness, once again appears in patent law’s utilitarian purpose and economic analysis.

The economic analysis of law has already a well-established framework for the allocation of loss that result from mistakes: the economic analysis of the tort system. The principles from tort law are fully applicable here, because, reduced to its essentials, claim drafting mistakes are just another category of human error that cause later loss. The loss can be allocated to one of two different parties, each of which will respond to the loss allocation in different ways. As is usual in such cases, transaction costs preclude an ex ante bargain that will make the allocation rule irrelevant under the Coase theorem; 175 since no competitor can pay putative patentees in advance to not make claim drafting mistakes, especially given that patent applications are prosecuted in secret.

The economic rules regarding efficient allocation of loss from mistakes are well-established. If the mistake can be reasonably avoided, the loss should be allocated to the party best able to avoid the mistake (i.e. the least cost avoider), creating a negligence rule. 176 If the mistake cannot be reasonably avoided, the shifting of loss to a faultless party—a strict liability system—only occurs when there is a compelling justification. 177

Which of these regimes best describes claim drafting mistakes by patentees? It would seem to vary by case. Some claim drafting mistakes are surely avoidable, and a negligence rule is appropriate for such cases. Some claim drafting mistakes, however, are not

\[175\] See Ronald H. Coase, The Problem of Social Cost, 3 J.L. Econ 1, 8 (1960).
reasonably avoidable. The allocation of loss between patentee and accused infringer is much harder in such cases, though, as detailed below, I believe they should still remain on the patentee.

1. Avoidable mistakes.

In cases of avoidable mistakes causing loss, the optimal incentive is to place the loss on the party best able to avoid the loss.\(^{178}\) If I can best avoid an accident by driving more carefully, I should bear the loss of failing to do so. Similarly, if I can best avoid the future dissipation of monopoly profits through better \textit{ex ante} claim drafting, I should bear the loss for failing to do so. This incentive structure is efficient for two reasons. First, the fact that the negligent party bears the loss means that they will take precautions, such as driving more carefully or drafting better claims.\(^{179}\) Second, the opposite regime (i.e. placing the loss on the non-negligent party) will create perverse incentives and moral hazards.\(^{180}\) If my negligent driving results in my victim paying me for the damage to my car, I will tend to drive very recklessly. If my negligent claim drafting results in my competitor paying me royalties, I will tend to draft very bad claims.

The loss here should be defined with some precision. The loss from a claim drafting mistake is the inadvertent omission of a foreseen product from the claim; but the loss has no monetary value until a competitor \textit{makes} the inadvertently omitted product.\(^{181}\) It takes two (patentee and at least one competitor) to dissipate a monopoly and its profits.\(^{182}\) Which party—patentee or competitor—is better able to avoid this loss?\(^2\)

In most cases, the patentee will be in a better position to avoid the loss, due to several advantages in information.\(^{183}\) The patentee drafts his patent, and is trying to delineate the scope of his own invention—the scope of what \textit{he} foresaw as the monopoly when determining incentives at filing.\(^{184}\) Any competitors, by contrast, will be attempting to discern a deviance from this patentee-subjective scope solely from

\(^{178}\) Calabresi, supra at note 176, at 135.
\(^{179}\) Id.
\(^{181}\) The dissipation of the monopoly is a social loss because it reduces patent incentives, assuming that the patent system induces more innovation benefit than its costs. Rich, supra at note 144, at 479.
\(^{182}\) Cf. Coase, supra at note 175, at 2 (noting that social costs are reciprocal).
\(^{183}\) See F. Scott Kieff, \textit{The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules}, 45 B.C. L. Rev. 55, 99 (2003) (“the patentee, as the drafter, is the least-cost avoider of such ambiguities”).
\(^{184}\) See Part II.A.3, supra.
reading the public record, comprising the patent and its prosecution history; and it is the patentee that creates the record in the first place. If a mistake causes the claim to encompass less than the patentee foresaw, the patentee has the best opportunity to avoid it. In cases where the mistake is reasonably avoidable, therefore, the patentee should generally bear the loss and be denied amendment to cure it.185

One area where this negligence principle is reflected in doctrine is the doctrine of equivalents, which operates similarly in effect to explicit claim amendment in that it treats an accused product that is different from the literal claim as infringing if the difference is “insubstantial.”186 Paten tally who seek to assert infringement under the doctrine of equivalents are often required to show they “could not reasonably be expected to have drafted” a better claim.187 A similar requirement can be imposed on all claim amendments, requiring the patentee seeking amendment to show that the initial claim drafting mistake was not reasonably avoidable.

What about the situation where the negligent mistake is obvious to everyone, patentee and competitor alike, and therefore the competitor is also at fault for designing a product that encroaches upon the inadvertently omitted domain? After all, it takes two to dissipate a monopoly—the patentee to fail to claim some product, and the competitor to make that product. A good example of this is Lemelson v. General Mills, Inc. 188 In that case, the patentee, Lemelson, claimed a “trackway” instead of a “toy trackway,” even though the entire patent specification was directed to a toy and not a real trackway.189 The defendant, Mattel, made a toy trackway.190 The mistake was easily avoidable with even minimal claim drafting care; but it was also surely the case that any competitor would understand the patent to really be directed at toys. If the patentee made a clear mistake, does the accused infringer have a special obligation to avoid exploiting the mistake?

In tort parlance, this is the problem of contributory negligence, where both parties have some ability to avoid the loss, and it is

185 See Meurer & Nard, supra at note 153, at 1987-91 (advocating greater claim refinement and narrower scope for the doctrine of equivalents).
187 Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 535 U.S. 722, 741 (2002) (“The patentee must show that . . . one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent.”).
188 968 F.2d 1202 (Fed. Cir. 1992).
189 Id. at 1203 & n.3.
190 Id. at 1204.
necessary to incentivize both parties. In patent law, however, true cases of optimal mutual avoidance are rare, and judicial correction is available in such extraordinary cases when the mistake truly is obvious to all, as in *Lemelson*. In more common cases an accused infringer can determine that a patentee potentially made a mistake only after an exhaustive search of prior art and a detailed analysis of the specification, which is cost-prohibitive. Even after such a detailed analysis, moreover, the accused infringer cannot know why the patentee failed to claim something that he had the legal right to do. The patentee may omit claiming something in the specification because he (1) did not foresee it becoming commercially valuable, (2) made a mistake in claim drafting, (3) has knowledge of secret prior art that the accused infringer lacks, or (4) simply dedicates the subject-matter to the public. Requiring the accused infringer to take steps to avoid unclaimed-but-claimable subject-matter assumes that the only reason patentees that fail to claim the full scope of their disclosure is by mistake, which is not true. Rather, given the information advantages possessed by the patentee, the efficient allocation seems to be to place responsibility to avoid losses on patentees. This is particularly the case when considering that one patentee can avoid the loss by claim drafting improvement; whereas each of multiple competitors must work to avoid it.

The current policy of liberal amendment creates precisely opposite regime, in that it grants patentees the ability to cure their mistakes, and transfers the loss to competitors by making them pay royalties. Not surprisingly, the strict transfer of loss to the non-negligent party—competitors who relied on claim language—creates perverse incentives and moral hazards to draft bad claims. When patentees profit from drafting misleading claims that can be amended to ensnare competitors, they will intentionally do so. When patentees are not punished for drafting bad claims that are amended to ensnare

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192 See *Group One, Ltd. v. Hallmark Cards, Inc.*, 407 F.3d 1297, 1303 (Fed. Cir. 2005) (allowing correction of errors “evident from the face of the patent”).
193 See text accompanying note 185.
194 Although most prior art is public, the patentee has special access to secret prior art created by himself. *Pfaff v. Wells Elecs.*, 525 U.S. 55 (1998) (secret prior sales by patentee).
195 Even if it were true, the general rule in mutual negligence cases is to leave the loss where it lies without judicial intervention, because contributory negligence creates efficient incentives for both parties to take reasonable care. *Posner*, *supra* at note 23, at § 6.4. The loss here lies initially with the patentee and there is no reason to shift it.
competitors, they will *recklessly* do so. Either way, because patentees are not punished for their mistakes, they have little incentive to draft good claims in the first place, resulting in vague issued claims being a common problem.\textsuperscript{197} The incentives are so perverse that patent attorneys *dislike* having an original claim granted without amendment, and such immediate allowances will usually trigger a continuation application to amend claims.\textsuperscript{198}

2. Unavoidable mistakes.

A more difficult question is presented when the claim drafting mistake is *not* reasonably avoidable, *i.e.* no one has acted negligently.

Initially, the scope of this problem must be defined. A mistake occurs when the patentee omits something that he *foresaw* from the claim. If the patentee did not originally foresee the accused product as part of his monopoly, then he is not entitled to take it by amendment. And the difficulty of claim drafting relates in substantial part to the difficulty of drafting sufficiently broad and vague claims that they encompass unforeseen developments. Conversely, the failure to claim something that was foreseen sounds almost like the very definition of negligence. After all, why fail to claim something if you had already foreseen it?\textsuperscript{199} Under this analysis, the category of unavoidable mistakes to which the patentee has a legitimate claim to remedy is basically nil.\textsuperscript{200}

As simple as the analysis is, it demands an understanding of reasonable behavior that is somewhat unrealistic. The nature of the problem comes from so-called “compliance costs.”\textsuperscript{201} For example, a reasonable person should use turn signals when driving; and it is easy to foresee that failure to do so might result in an accident. But it is hard to ensure that one uses turn signals *every time* when turning and changing lanes—virtually nobody does so.\textsuperscript{202} Similarly, it is easy to say

\textsuperscript{197} See text accompanying notes 14–18.
\textsuperscript{198} See Kinney & Lange, P.A., *Intellectual Property Law for Business Lawyers* 3.4.3 (2003) (“Patent attorneys generally do not like to have applications allowed when they are first submitted.”).
\textsuperscript{199} See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359, 1370 (Fed. Cir. 2003) (*en banc*) (“there can be no other reason the patentee could not have described the substitute in question”).
\textsuperscript{200} Meurer & Nard, *supra* at note 153, at 1987-91 (advocating greater claim refinement as a solution to mistakes in drafting).
that a reasonable person should be able to type an individual word without a typographical mistake, especially when typing an important contract; but it is almost impossible to ensure that a 1,000 page contract is completely free from typographical error. The cumulative difficulty of perfect compliance (when each individual instance seems easy) leads to the almost oxymoronic phenomenon of reasonably negligent behavior.

Patent drafting mistakes are sometimes unavoidable due to compliance costs. It is difficult to ensure that a good claim leaves nothing foreseen out of its scope, just as it is difficult to insure that a good contract has no typos. At the same time, deterring negligent behavior necessarily requires disregarding compliance costs, because it is impossible to tell ordinary negligence apart from inevitable compliance error. If saying that the accident occurred during that rare and unavoidable instance when you failed to use the turn signal is a defense to negligent driving, then every driver who failed to use the turn signal would argue it.

Ignoring compliance costs does have the effect of holding parties strictly liable for some unavoidable mistakes. But this is not a bad rule for patent drafting. First, there is no middle ground: either patentees can have amendments or they cannot. It is impossible to have a compromise position where patentees can amend if they show that the error was a result of unavoidable compliance cost induced mistakes—because nobody can tell whether the mistake was compliance cost induced. Second, in the absence of a compelling justification, the law shifts loss only through a showing of negligence, or leaves the loss where it lies. The loss of monopoly profits initially falls upon the patentee, who must seek both PTO intervention (filing a continuation or reissue) and judicial intervention (adjudicating an infringement suit). The administrative cost counsels against such intervention. And patentees do not have a compelling justification to shift the loss from their mistakes to their competitors, even if the mistakes were unavoidable. The fact that a patentee unavoidably—and thus blamelessly—messed up his claim is hardly a reason that other blameless people (competitors and consumers) must now pay him for his unavoidable mistake.

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203 See Lichtman, supra at note 19, at 2017 (“it is hard to fault Tessera's attorneys, who surely had their hands full perfecting the rest of that unwieldy 104-word descriptive articulation”).

204 Grady, supra at note 202, at 306.

205 Henderson, supra at note 177, at 390-94 (2002) (arguing that strict liability shifting of loss is the exception).
Third, the major defect of a strict liability regime is that it induces perverse incentives and moral hazards.\textsuperscript{206} If drivers are held strictly liable for all accidents, then pedestrians have less incentive to look both ways before crossing the street; while holding pedestrians strictly liable induces drivers to drive recklessly. This is a problem when each party has some ability to avoid the loss. But, as discussed above, such ability by accused infringers is very rare in patent law.\textsuperscript{207} Not only is the analysis of potential patentee coverage very difficult for an accused infringer to conduct, but the accused infringer also has no idea why the patentee failed to claim something in the specification, with unavoidable mistake hardly being the only explanation. The one area where the accused infringer does have an advantage—comparing the unamended claim to his particular product—he has an undiminished incentive to take all reasonable care. The moral hazard of reduced care by accused infringers is practically non-existent even if strict liability for claim drafting is placed on patentees.

Finally, the problem of disregarding compliance cost is mitigated significantly by a causation requirement.\textsuperscript{208} Although it is inevitable that all of us will occasionally drive negligently, it rarely matters because we are lucky and our negligence causes no accidents. For patentees, not every claim drafting mistake will cause a competitor to intrude upon the expected monopoly. The notice function of claims is a legitimate limit on claim amendment only when there is reliance, as the next section discusses.

3. Harmless mistakes.

The analysis up to now has emphasized the comparative advantage of patentees versus their competitors in avoiding losses from claim drafting mistakes. Not all claim drafting mistakes cause losses, even when a claim amendment transforms an otherwise non-infringing competitor into an infringer. If the patentee mistakenly writes “cone” instead of “octagon” and therefore fails to claim octagonal coal cars, the mistake may still be harmless, even if a competitor produces octagonal coal cars (it goes without saying that if no competitors produce octagonal coal cars, the mistake is harmless).

A claim drafting mistake is only harmful if the competitor relies on the claim language.\textsuperscript{209} If the competitor would choose to produce

\textsuperscript{207} See text accompanying notes 191–194.
\textsuperscript{208} See Landes & Posner, supra at note 201, at 230-33.
octagonal coal cars no matter what—even at the risk of infringement damages—then it does not matter what the patentee writes in his claim and any mistakes in such writing are harmless.

Furthermore, it is important not to over-deter claim drafting mistakes by punishing harmless mistakes.\textsuperscript{210} It is an inefficient waste of social resources for patentees to spend money avoiding harmless mistakes.\textsuperscript{211} This applies regardless of whether the regime is governed by negligence or strict liability,\textsuperscript{212} since without harm there is nothing to allocate.

Patents are public instruments, and reliance on issued claims is normally presumed.\textsuperscript{213} But such reliance can only extend to issued patents, and indeed before issuance many patent applications are kept secret (giving competitors nothing upon which to rely).\textsuperscript{214} Therefore, the possibility of competitor reliance does not serve as a rationale to limit claim amendment before issuance, because pre-issuance drafting mistakes cause no reliance harm. In other words, the notice function of claims is not undermined by pre-issuance amendment. In contrast, the definitional function and the possibility of misappropriating third-party insights applies any time after filing, and is not triggered by issuance.\textsuperscript{215} The difference between the notice and definitional functions, separated by the issuance threshold, leads to different policy implications in Part III. Post-issuance amendments should never be allowed, while pre-issuance amendment should be permitted in some circumstances.

\textsuperscript{210} See Thomas C. Galligan, Jr., \textit{Augmented Awards: The Efficient Allocation of Punitive Damages}, 51 La. L. Rev. 3, 49 (1990) (over-deterrence leads to inefficient over-investment in safety).

\textsuperscript{211} Internalizing the \textit{expected} harm \textit{ex ante} (at the time of original claim drafting) is achieved by compensating the \textit{actual} harm \textit{ex post}. Posner, \textit{supra} at note 23, § 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).

\textsuperscript{212} See 63 Am. Jur. 2d (Products Liability) § 627 (proximate causation for strict products liability).


\textsuperscript{215} See Part II.B, \textit{supra}. 
D. Summary: De Facto Omnibus Claiming

An intuitive way to understand the problems of unlimited retroactive claim changing is to consider the following claim, filed either as an original or amended claim:

I claim whatever is enabled and described by the specification, and that is not made obvious by the prior art.

This is a so-called “omnibus claim,” and has long been prohibited. The reasons for this prohibition are obvious. Such an omnibus claim would make it very difficult to tell what the claim covered. Moreover, the patentee should know what his own invention is, and it seems grotesque for him to draft a claim that conveys no useful information in this regard.

At the same time, an omnibus claim has advantages. An omnibus claim renders all other claims unnecessary. It automatically self-adjusts to reach the patentee’s maximum possible scope, and no more. The discovery of new prior art will automatically shrink the claim (since it claims only that which is “not made obvious by the prior art”). Allowing omnibus claims thus would make patent examination and claim construction also unnecessary. The PTO need not consider whether the patent is new, because it only claims what is new, and if there is nothing new the patent would claim nothing. Courts need not construe vague claim language, since there is no claim language of any substance to construe.

Saying omnibus claims have advantages, however, is simply another way of saying written claims have disadvantages. It should be recognized that omnibus claims are empty vessels—useful precisely because they say nothing of substance. A patent with an omnibus claim is not different from a patent with no claims at all, or a claim saying “I claim what the law allows me to claim.” It lands us right back in square one with all the problems encountered in Evans v. Eaton. The written claim evolved because its notice and definition advantages outweigh the administrative cost of examining them and judicial cost of construing them. These advantages result in the modern “peripheral” claim, where a claim should set forth the

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boundary of a patent in detail. The importance of peripheral claims is reflected by the tremendous amount of judicial effort devoted to determining what individual words in peripheral claims mean.

The irony of the situation is that, after all the effort devoted to construing vaguely-written peripheral claim language, a patentee who does not like the result can simply change the claim language at issue. The scope of the patentee's ability to change is precisely whatever is enabled and described by the specification, and that is not made obvious by the prior art. Claim changing achieves the omnibus claim, but through the back door. The fact that claim language is so easily changed puts all the resources devoted to interpreting and examining prior claim language to waste.

If the current policy of unlimited claim changing is a good idea, then courts should simply achieve the desired scope much more directly, by allowing an omnibus claim for every patent. This will allow us to shut down the PTO and eliminate claim construction disputes that clog both district courts and the Federal Circuit docket, saving a great amount of taxpayer money. But if explicit omnibus claiming is not a good idea—and that appears the consensus view—it makes no sense to achieve omnibus claim scope through the back door, by allowing unlimited claim changes that are limited only by the specification and prior art. This tortuous route of current law achieves the worst of both worlds: we spend a great deal of resources to examine and construe written claim language, but get none of the notice and definition benefits when patentees change that language.

III. SOME POLICY PROPOSALS

If written claims are to be meaningful, they cannot be changed at-will. But not all changes to claims are equally harmful. As described in the previous section, claims serve two functions. The first function

221 Gentry Gallery v. Berkline Corp., 134 F.3d 1473, 1480 (Fed. Cir. 1998) (“An applicant is entitled to claims as broad as the prior art and his disclosure will allow.” (quoting In re Rasmussen, 650 F.2d 1212, 1214 (C.C.P.A. 1981)).
222 See Elizabeth D. Laporte, Managing the Runaway Patent Case, Association of Business Trial Lawyers Report, Jan. 2008, at 1, 6 (“Many judges and practitioners believe that the average patent case consumes at least ten times the judicial resources as the typical civil case.”).
is to force the patentee to define what he invented at the time of filing, and prevent later incorporation of new insights that did not contribute to the patentee’s original incentive. This definitional function applies any time after the patent is filed, since the patentee should be made to state his invention at the earliest opportunity after filing, much as a witness’s testimony should be taken as soon as possible to the relevant event. By contrast, the notice function of claims and the allocation of loss from claim drafting mistakes becomes relevant only after the claims are issued, when the public can rely on such notice. Because the definitional and notice rationales apply at different time periods, the policy implications are somewhat different.

A. No Retroactive Priority Against Third-Party Insights

The first problem of allowing claim amendment is that patentees have a strong incentive to misappropriate later-arising insights through amendment, thereby expanding their monopoly. The reason this is problematic—aside from simple unfairness toward whichever party the insight is appropriated from—is that an expanded monopoly of this type creates social cost with very little incentive benefit in return. Because the later-arising insight was unforeseeable at the time of filing, the patentee derives little ex ante incentive from capturing it. However, the social cost remains the same.

Patentees should therefore not be permitted to capture later-arising insights, which were unforeseen at the time of filing. The problem of undue windfalls by later amendment, however, need not result in the elimination of all claim amendments. Not all claim amendments, after all, are directed toward newly arising insights; some are simply attempting to fix mistakes. Although we would expect patentees to claim everything they foresee in an original claim, some claim drafting mistakes are inevitable while doing so, due to compliance costs. In the absence of competitor reliance (which occurs only post-issuance), the possibility of abusing amendment to capture undue windfalls does not itself justify eliminating all claim amendment if there is a narrower solution.

The narrower solution is to deny claim amendments retroactive priority. Retroactive priority is somewhat different from the retroactive effect of amended claims on a competitor’s factory. The retroactive effect on a competitor factory comes from the fact that the factory is built with a long time-horizon. The retroactive priority of a claim, however, comes from the fact that amended claims are treated as if filed on the date of the initial application—it does not require competitors to make any long-term investments. Take the following example:

January 1, 2000    Patentee files application.
January 1, 2001    Competitor comes up with insight.
January 1, 2002    Patentee files amendment claiming insight.

Misappropriation by amendment is possible because the amended claim is treated, for almost all purposes, as if it existed on January 1, 2000. All that is necessary to prevent the amendment from capturing the later insight is to deny the amendment this retroactive priority and consider it as claiming an invention on January 1, 2002. The amended claim then becomes unpatentable, because the competitor’s insight becomes prior art once the amended claim is given the later priority date.223

The denial of retroactive priority effectively precludes appropriation of later developments through amendment.224 This preserves claim amendment during the patent prosecution process for legitimate uses—to fix claim drafting mistakes during a period when such mistakes are largely harmless. The harmless mistake rationale, however, does not hold after the patent issues. One the patent issues, there is no compelling justification for amending its boundaries.

B. End Post-Issuance Claim Amendment

The two problems of claim amendment—windfalls to patentees through capturing later information and frustrating public reliance on claim language—become more problematic over time. At the time of patent filing, there are usually no later insights to capture. Before the patent issues, competitors and the public have little upon which to rely.225 Thus, while some limit on pre-issuance claim amendment is necessary to prevent capture of later insights, the protection of competitors and public notice is not a compelling rationale until after the issue of the patent.

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. There are now more insights to capture because of the passage of time, and because competitors have an incentive to improve upon patent disclosures.226 These improvers (or pirates, depending on perspective)

223 Peters v. Active Mfg. Co., 129 U.S. 530, 537 (1889) (“That which infringes if later would anticipate if earlier.”).
224 The priority is only important against third-party activity. The patentee’s own activities should not create a statutory bar against amendment.
225 See text accompanying notes 213–215.
226 State Indus. v. A.O. Smith Corp., 751 F.2d 1226, 1236 (Fed. Cir. 1985). The incentive to improve was traditionally protected by the experimental use
are also more likely to find unexpected prior art than patent examiners who rely on applicants to disclose prior art in *ex parte* examination proceedings. The very fact of issuance and attendant publicity leads to the creation of more insights. Thus, while the problem of capturing new insights is not unique to post-issuance conditions, it becomes a greater concern in the post-issuance era.

Patent issuance also gives competitors and the public a legitimate reason to expect that the claims fully define the invention. The issued claims are supposed to “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.” Claims that may be changed later simply do not inform anybody of what can be “safely used or manufactured without a license”; and certainly do not do so through “the life of the patent.”

As compared to the great harms of permitting post-issuance claim amendment, the risk of penalizing harmless claim mistakes is diminished by the time of issuance. An original patent application takes, on average, about two years to issue. If the patentee cannot discover and correct an innocent mistake within that time, the chance is minimal 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. A bright-line rule forbidding post-issuance claim amendment thus fixes a stable patent boundary, promotes notice, secures competitor reliance, discourages the retroactive claiming of unforeseen insights, and is unlikely to impose disproportionate costs on the incentive to invent.


227 See 37 C.F.R. § 1.56 (applicants’ duty to disclose prior art to the PTO); Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 Nw. U. L. Rev. 1495, 1528 (2001) (“Examiners do not in fact spend long hours poring over a patent application or the prior art. They spend very little time, and far less than either the lawyers or the triers of fact in infringement cases.”).

228 *Permutit Co. v. Graver Corp.*, 284 U.S. 52, 60 (1931).


230 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)
Post-issuance claim amendments are currently permitted during reissue and reexamination proceedings, and through continuations. None of these devices need be completely abolished. Because patentees can file multiple original claims, a single overbroad claim can be canceled using reissue or reexamination, with the narrower claims being rewritten for stylistic purposes (without substantive amendment), a common practice known as “rewriting into independent form.” Continuation applications also have legitimate uses that do not involve misappropriating later insights or undoing competitor reliance; namely that continuations are useful to continue prosecution of original claims when there is reasonable disagreement about their patentability between applicant and examiner, which need not always involve an appeal. Thus, I am not proposing to end any of these devices, only to end their use in facilitating post-issuance claim amendment.

IV. CONSIDERING OBJECTIONS

A. The Sky Has Not Fallen

One simple objection to my analysis might be that, even if claim amendment might create problems in theory, it is a longstanding feature of the U.S. patent system that has not caused significant problems in practice. Although anecdotal accounts of claim amendment abuse are common, the plural of anecdote is not data. Moreover, while the worst possible abuses are made possible by post-issuance amendment, empirically continuations account for only 23% of issued patents, and reissue and reexamination are even rarer. If laying traps for unwary competitors is so profitable, why don’t patentees do it all the time?

233 Schreiner & Doody, supra at note 136, at 559-60.
235 Id. at 69.
This rosy view of the current system needs some qualification. First, there is good evidence that uncertain boundaries do cause problems for the patent system, given that the patent system appears to induce more litigation costs than research and development expenditure.\textsuperscript{236} Frequent litigation is a good proxy for failing boundaries and inadequate notice because the purpose of clear boundaries is to allow private ordering without litigation.\textsuperscript{237} Second, continuations and other amendment devices contribute disproportionately to litigation and thus the notice failure of the patent system. Although continuations account for only 23\% of issued patents, they account for 52\% of litigated patents.\textsuperscript{238} Therefore, remedying the uncertainty problem is worthwhile, and claim amendment that makes patent boundaries constantly move is a significant factor in this uncertainty.

As for the fact that not every patentee files multiple claim amendments, a likely explanation is the cost of continuations (which are by far the most important procedural device for amendment). Although one could theoretically keep a chain of continuations running for all 20 years of the patent lifespan and thereby achieve continuous amendment, doing so is expensive because each continuation requires a fee and an attorney to prosecute it,\textsuperscript{239} and each continuation only lasts for a few years before a new one must be filed.\textsuperscript{240} In this way, the expense of continuing patent prosecution acts as a “costly screen.”\textsuperscript{241} Another way of implementing a bar to post-issuance claim amendment, or of reducing the number of pre-issuance amendments, would be to charge a prohibitive fee for the privilege.

\textsuperscript{236} Bessen & Meurer, \textit{supra} at note 6, at 130-44.

\textsuperscript{237} Rich, \textit{supra} at note 10, at 501; Kimberly A. Moore, \textit{Forum Shopping in Patent Cases: Does Geographic Choice Affect Innovation?}, 79 N.C. L. Rev. 889, 928 (2001) (“Unpredictability or uncertainty in the boundaries of the patent holder’s property right . . . will divert resources from innovative efforts (research and development) to enforcement (transaction or litigation costs).”).

\textsuperscript{238} Lemley & Moore, \textit{supra} at note 49, at 70; see also John R. Allison \textit{et al.}, \textit{Valuable Patents}, 92 Geo. L.J. 435, 457 (2004) (“each litigated patent resulted from an average of 2.57 different applications”).

\textsuperscript{239} The exact math depends on how the continuation “chain” is implemented. Filing a formal continuation application (necessary for the original patent to issue) incurs a fee of $1090. 37 C.F.R. § 1.16. Filing a request for continued examination incurs a fee of $810. 37 C.F.R. § 1.17(e). These are per application amounts and quickly add up.

\textsuperscript{240} Lichtman, \textit{supra} at note 19, at 2018.

Despite already substantial PTO fees, however, it appears that applicants are filing more claim amendments than ever.\textsuperscript{242} Nor can PTO fees be raised much further, since they are either statutorily mandated or can only be raised to recover the costs of the PTO,\textsuperscript{243} not for broad social policy purposes such as protecting the notice and definition functions of written claims. Thus, while PTO fees have been a useful procedural limit on abuse of claim amendment—a way of limiting the damage—more direct substantive limits should be considered.

B. Maintaining Patentee Incentives

A major concern with limiting the ability of patentees to amend claims is that it will reduce incentives to invent and disclose inventions. The patent system involves a trade-off between these incentives and the cost of monopoly.\textsuperscript{244} Reducing patentee options \textit{ex post} will inevitably work to reduce \textit{ex ante} incentives to some extent.

Of course, if no reduction in patentee incentives were to be permitted, then we would have patents of unlimited scope and infinite duration. The point of the patent system is to balance incentives and cost.\textsuperscript{245} My point in this article is to propose improvements that, overall, will save society more in monopoly cost than the reduction in patentee incentives. The fact that patentee incentives may be reduced to some extent is not a persuasive barrier if those reduced incentives are offset with other social benefits.

Limiting the ability of patentees to engage in misappropriation of later insights by amendment serves this purpose because of the unequal discounting differential, as described in Part II.B. The inability to capture unforeseen developments does little to reduce pre-filing incentives—the logical corollary of the fact that unforeseen windfalls do little to increase pre-filing incentives. Once the significant monopoly cost incurred in conferring the windfall is considered, the balance points to limiting the use of amendments to capture unforeseen developments.

Similarly, although patentees may feel reduced incentives from being forced to bear the loss of their mistakes, this is offset by the

\textsuperscript{242} Lemley & Moore, \textit{supra} at note 49, at 69 ("the trend has been a steady increase"); Allison \textit{et al.}, \textit{supra} at note 238, at 458 ("applicants are increasingly securing their ability to file additional claims through an extensive continuation practice").


\textsuperscript{244} See text accompanying notes 142–145.

gains in incentives from competitors in being able to rely on written claims and increase competition in legitimate products. To take the driving analogy once more, if I can drive recklessly and make the pedestrians I hit pay for the damage, I will have tremendous incentives to drive more often, with the benefit that I will get to places I need to go faster. However, this incentive is not worth the cost, the cost being that pedestrians will stop walking when I am in the area. Likewise, the fact that patentees can intentionally draft misleading claims and redefine their inventions later traps competitors into infringement. Since competitors thus trapped cannot rely on claims to avoid future infringement and have no other cost-effective means of ascertaining patent boundaries (exhaustively analyzing every patent specification and the entire prior art being cost-prohibitive), they must treat occasional patent infringement as an unavoidable cost of doing business, raising prices and reducing quantity on all goods (whether or not eventually found to be infringing). Consumers are thus made worse off as a result.

C. The Efficiencies of Delayed Adjudication

Another argument for allowing post-issuance amendment is that it saves the bulk of administrative and judicial resources for the patents that really matter: those that are involved in litigation or at least licensed. Under this theory, ex ante claim drafting and examination is largely an inefficient use of social resources, because only 5% of patents will eventually be litigated or licensed. The remaining 95% of patents turn out to be on worthless inventions, and the ex ante resources spent on prosecuting and examining them could have been better spent elsewhere.

As applied to PTO examination, I have no disagreement with this argument. If a patent covers what turns out to be a worthless invention that nobody wants and nobody infringes (e.g. a Rube Goldberg machine), then we never have to consider its validity, because nobody cares. In such cases, the resources spent on ex ante examination (which considers whether the patent is valid) truly are wasted.

But how do we figure out if a patent covers only a worthless invention, so as to not bother litigate or license it? By looking at the claims! Even for patents that are never litigated or licensed, the resources spent on drafting clear boundaries ex ante are not wasted.

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246 See Lemley, supra at note 117, at 21-22.
247 Hubbard, supra at note 20, at 359-62.
248 Lemley, supra at note 227, at 1507 (providing 5% estimate).
The very point of claims is that they permit a fast and certain determination of the scope of monopoly (and consequently the worth of the patent) without requiring litigation.\textsuperscript{250} The fact that 95\% of patents are quickly determined to be worthless and never litigated is a success, not a failure, of clarifying patent scope early. Indeed, the very fact that the rate of patent litigation even approaches 5\% shows systemic failure in comparison to other property systems. Imagine the chaos that would result if even 1\% of all real property deeds were so ambiguous that parties have to go to court to resolve their boundaries: given the hundreds of millions of homes and other properties across the United States, the court system would quickly become overwhelmed.

To be sure, it is possible to imagine a world where \textit{ex ante} claim drafting is extremely costly, and \textit{ex post} determination without claims is extremely cheap, such that the efficient mechanism is \textit{ex post} delineation of scope. Some patents are clearly worthless even without looking at the claims—\textit{e.g.} fanciful inventions such as perpetual motion machines. If the number of facially worthless patents is sufficiently high (thus the cost of \textit{ex post} determination sufficiently low), and the cost of claim drafting is also high, then \textit{ex ante} claim drafting becomes inefficient. Such a hypothetical world, however, is not one that we live in. And if such a world ever came into being, the efficient solution would be to abolish \textit{ex ante} claim drafting and permit omnibus claims—not to require detailed claims that are costly to draft but also permit them to be changed later.

D. \textit{Less Drastic Alternatives}

1. Prior user rights.

In a report addressing the problems of the patent system, the Federal Trade Commission identified the phenomenon of misappropriation by amendment as a problem and proposed “prior user rights” as a solution.\textsuperscript{251} A prior user right is a personal right to continue a prior course of business, even though an intervening patent now makes the course of business infringing.\textsuperscript{252} For example, if I build a factory to make tables, and a patent on tables then issues, I would normally be required to stop using the factory. The patent could be valid because it was \textit{filed} before I started building my factory (and thus

\textsuperscript{250} Rich, \textit{supra} at note 10, at 501.


has priority over me), and *issues* after the factory is complete. A prior user right would permit me to keep using the factory to make more tables, despite the newly issued patent.

The timing mechanics of prior user rights function similar to my proposal of denying priority to claim amendments. In each case, the time sequence is as follows:

| Patentee files application | Third-party develops new product | Patentee amends to capture new product |

The difference between a prior user right and my proposal is that a prior user right gives the third-party a personal right to use the product with the patentee, creating a *duopoly*. My proposal invalidates the amended claim outright, creating *perfect competition*. Which of these effects is better?

One quick response might be that we always prefer competition to duopoly to monopoly, but this is an overstatement. The monopoly profits of a patent are necessary to its incentive. In some circumstances, if we were attempting to incentivize the patentee while protecting the incentives of one particular third-party competitor, creating duopoly between them that splits the profits between these parties may be a good compromise.

A compromise between the patentee and a particular competitor, however, bears no relationship at all to the harms created by capturing later insights through amendment. The reason that retroactive capture is bad is that the patentee did not foresee the particular insight or product, and therefore gained very little pre-filing incentive to invent or disclose. This problem is completely unrelated to the interests of any particular competitor. The economic harm of misappropriation by amendment is social—everyone pays inflated prices in a monopoly while gaining very little in pre-filing incentive benefit. Paying monopoly profits to a patentee for no incentive gain is

256 See Part II.B.
a bad deal. Paying duopoly profits for no incentive gain is marginally better, since duopoly profits are lower\textsuperscript{257} but it is still bad deal.

While the unfairness intuition points to protecting the particular competitor whose insight is captured by the patentee (in which case a personal right to that competitor might suffice); the economic rational of balancing monopoly cost with incentive benefit suggests that prior user rights are insufficient to protect society. Allowing prior user rights still permits patentees to retain a significant windfall. To prevent undue windfalls, patentees should not be permitted to capture insights at all.

2. Intervening rights.

Separate from the problem of undue windfalls, there is the problem of competitor reliance on issued claims. The traditional method of protecting competitor reliance has been intervening rights\textsuperscript{258} which has been recognized by the Supreme Court since 1940\textsuperscript{259} though they have not been applied to continuations\textsuperscript{260}. Intervening rights exempt competitors from damages prior to the reissue of a patent. A court may also permit (in its discretion) a personal right to continue infringement\textsuperscript{261}. A competitor that builds a factory to make three-legged tables may be permitted to continue using the factory, even if a reissued claim now makes the three-legged tables infringing. In this way, intervening rights function quite similarly to prior user rights.

A robust application of intervening rights—and extending them to cover all post-issuance amendments including those made through continuations—can mitigate many of the notice harms I have described\textsuperscript{262}. At the same time, intervening rights are a second-best substitute for ending post-issuance claim amendment altogether.

First, intervening rights cannot address the definition problem—patentees using amendment to capture later insights as windfalls—since intervening rights also creates a duopoly. The problem of unanticipated windfalls becomes more significant during the post-issuance era, because of the simple passage of time increases the risk of unanticipated windfalls occurring and because issuance creates an

\textsuperscript{257} Vermont, \textit{supra} at note 255, at 498 (describing Cournot duopoly).
\textsuperscript{258} See text accompanying notes 46–48.
\textsuperscript{259} \textit{Sontag Chain Stores Co. v. National Nut Co.}, 310 U.S. 281 (1940).
\textsuperscript{261} \textit{See BIC Leisure Prods., Inc. v. Windsurfing Int'l, Inc.}, 1 F.3d 1214, 1220 (Fed. Cir. 1993) (describing intervening rights).
\textsuperscript{262} Lemley & Moore, \textit{supra} at note 49, at 109-11 (advocating intervening rights as a solution to the problems created by continuations).
incentive to design-around and make improvements.263 Indeed, the most common situation where intervening rights arise today—reexamination to overcome newly discovered prior art—is a situation where patentees amend claims in response to unforeseen developments (in this case, previously unknown prior art).264

Second, courts have not been particularly robust in applying intervening rights to protect competitors. The problem of claim amendment on competitors is that the new claim retroacts on long-term investments previously made, such as a table-factory that can no longer be used to make tables. While courts do have discretion to permit continuing use, this discretion is exercised sparingly.265 The most extreme example of this is *Shockley v. Arcan, Inc.*,266 where the Federal Circuit held that a finding of willful infringement of a reissued patent creates unclean hands against continuing use.267 Under the Federal Circuit’s doctrine at the time, willful infringement consisted of (1) finding out about the reissued patent and (2) failing to immediately cease the infringing activity,268 i.e. it was willful infringement to continue using the factory after being sued. Thus, continuing willful infringement was the very activity sought to be permitted under intervening rights. A doctrine that willful infringement (as then defined) precluded intervening rights effectively rendered the set of circumstances where continuing use would be permitted non-existent. In light of this history, intervening rights seems an unreliable device by which to protect competitor reliance.

3. Limiting the number of continuations.

The problems of unlimited claim amendments has also been noticed by the PTO. The PTO attempted to address this problem in 2007 by enacting regulations that would have limited the number of continuations at three, with additional continuations requiring good cause.269 These regulations were promptly enjoined and have never taken effect.270

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263 See text accompanying notes 226–227.
265 See cases cited at note 48, supra.
266 248 F.3d 1349 (Fed. Cir. 2001).
267 Id. at 1361.
Given the problems caused by unlimited claim amendment, limiting the number of continuations (the worst method of claim amendment) to three would have been a good start. At the same time, three continuations still provide a total of seven rounds of claim amendment, six of those potentially after the issuance of a first patent. Therefore, even under the PTO’s proposal, claim changing through multiple continuations would persist for years after a patent first issues, resulting in meaningless and uncertain boundaries for that entire duration until the third continuation is exhausted.

Numerical limits on continuations also have the potential to be overly restrictive. Not all continuation applications are bad. Some are used to keep pursuing original claims while avoid the expense of an appeal; and continuations can also be used to fix mistakes prior to issuance of any patent. Although I am inclined to think that three continuations should be more than enough for these legitimate purposes (and patentees can petition for more under the PTO rules if they have good cause), the focus should remain on the substantive harm of claim amendment rather than the particular procedural vehicle by which such amendments are pursued.

CONCLUSION

Because patentees have broad freedom to file multiple original claims, resort to claim amendment after filing occurs for only two reasons: (1) to react to unforeseen developments discovered after filing, or (2) to correct a mistake in articulating what the patentee foresaw at the time of filing. Both of these motivations pose significant problems. Permitting a patentee to capture unforeseen developments confers an inefficient windfall upon him. Permitting the patentee to correct his own drafting mistakes shifts the loss of those mistakes onto competitors, reducing the patentee’s incentives to take reasonable care.

To eliminate these perverse incentives, I propose eliminating post-issuance amendment. This preserves competitor reliance on issued claims, fixes a meaningful patent boundary, and gives patentees efficient incentives to take proper care in drafting claims. Because competitor reliance is much diminished before issuance, and because

precise formulation was two formal continuation applications and one request for continued examination. Id.


271 Each continuation provides two rounds of claim amendment. 37 C.F.R. § 1.113 (2008). The original application receives one round of claim amendment as-of-right. 37 C.F.R. §§ 1.111 & 1.112 (2008). Thus an original application plus three continuations result in seven rounds of amendment.

272 See text accompanying note 207.
harmless mistakes in claim drafting will occur and can be efficiently remedied during prosecution, pre-issuance amendments should be permitted. Such pre-issuance amendments, however, should not be permitted to capture later third-party insights, and denial of retroactive priority to pre-issuance amendment permits their use in curing of mistakes while preventing the possibility of retroactive capture.

Beyond such a technical analysis, the problems of unlimited claim amendment are really quite intuitive. A claim subject to unlimited post-hoc amendment is useless as a boundary, since it neither defines the patentee’s real ability to exclude nor provides meaningful notice to competitors. A fence that could be moved tomorrow is not a fence that anyone should rely on to determine where to build a house. The very purpose of having a written claim—definition and notice—require that the written claim be meaningful and binding. A binding claim, of course, cannot be one that is changed-at-will.