
ENDING ABUSE OF PATENT CONTINUATIONS

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INTRODUCTION	64
I. THE CURIOUS PRACTICE OF CONTINUING PATENT APPLICATIONS	66
A. <i>How the System Works</i>	66
B. <i>The Use of Continuation Practice</i>	69
II. THE PROBLEMS WITH CONTINUATION APPLICATIONS	71
A. <i>Problems Created By Continuations</i>	71
1. Delay and Uncertainty	71
2. Wearing Down the Examiner	74
3. Changing Claims	76
4. Submarine Patents	79
5. Evergreening	81
B. <i>Attempts to Combat the Problems Created By Continuations</i>	83
1. Changing the Patent Term	84
2. Publishing Patent Applications.....	88
3. Increased Use of the Written Description Requirement	90
4. New Prosecution Laches Defense	92
III. ELIMINATING CONTINUATION APPLICATIONS.....	93
A. <i>Justifications for Continuation Applications</i>	94
B. <i>Scope of the Abolition</i>	101
C. <i>Alternatives to Abolition</i>	105
1. Limiting the Number of Continuations	106
2. Preventing Broadening of Claims During Continuation Applications.....	107
3. Publishing Applications.....	108
4. Creating Intervening Rights	109

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5. Limiting the Time an Application Can Spend in Prosecution	111
CONCLUSION.....	118
APPENDIX A – Table 1: Issued Patents from 1976-2000: Total Prosecution Time	119

INTRODUCTION

One of the oddest things about the United States patent system is that it is impossible for the U.S. Patent and Trademark Office (“PTO”) to ever finally reject a patent application. While patent examiners can refuse to allow an applicant’s claims¹ to ownership of a particular invention, and can even issue what are misleadingly called “Final Rejections,” the patent applicant always gets another chance to persuade the patent examiner to change her mind. Even stranger, perhaps, is that the PTO doesn’t even possess the power to finally *grant* a patent. Even when the examiner concludes that an invention is patentable and issues a “notice of allowance,” the patent applicant always retains the right to abandon the application that was deemed patentable and start the process over again. Alternatively, an applicant can take the patent awarded by the PTO and, at the same time, seek additional or broader claims arising out of the same patent application. In all three cases, the culprit lies in what is known as the “continuation” application.²

Applicants dissatisfied with the course of patent prosecution can abandon an application and file a continuation. Alternatively, a patentee can prosecute one or more patents to issue and also keep a continuation application on file, hoping to win a better patent from the PTO in the future. We describe this rather remarkable practice in Part I. We also report the results of our comprehensive empirical study of continuation applications, which demonstrates the frequency with which this process is used and abused. In an effort to study the pervasiveness of this practice, we compiled an original dataset comprising 2,224,379 patents, every patent issued from 1976 through 2000.³ We collected the data on the patent filing dates, issuance dates, whether the

¹ The legal scope of an invention is defined by the “claims” of a patent, which set the boundaries of the rights granted. *See* *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 373 (1996) (discussing patent claims).

² Traditional continuation applications are governed by 35 U.S.C. § 120 (2000). Statutory changes at the end of the last century created an alternative, the “Continuing Prosecution Application” (“CPA”), which permits the prosecution of a continuation without the filing of a new application, but does not otherwise affect the substantive rules governing continuation applications. *See* Request for Continued Examination Practice and Changes to Provisional Application Practice, 65 Fed. Reg. 50092, 50093 (Aug. 16, 2000) (to be codified at 37 C.F.R. pt. 1). In this article, we will treat section 120 continuations and CPA/RCE continuations interchangeably because their policy effects are indistinguishable.

³ Professor Moore has presented this empirical study in several recent federal district court litigations in order to provide the court with a context to assess the reasonableness of prosecution delays. *See* Table 1, *infra* Appendix A.

patent claimed priority to an earlier filed application, the date of the earliest claim to priority, and whether any other patent in the priority chain was issued and when.

Continuation practice has a number of pernicious consequences, which we detail in Part II. First, at a minimum, continuation practice introduces substantial delay⁴ and uncertainty into the lives of a patentee's competitors, who cannot know whether a patent application is pending in most circumstances. Second, the structure of the PTO suggests that continuations may well succeed in "wearing down" the examiner, so that the applicant obtains a broad patent not because he deserves one, but because the examiner has neither incentive nor will to hold out any longer. Third, continuation practice can be—and has been—used strategically to gain advantages over competitors by waiting to see what product the competitor will make, and then drafting patent claims specifically designed to cover that product. Finally, some patentees have used continuation practice to delay the issuance of their patent precisely in order to surprise a mature industry, a process known as "submarine patenting."

Congress and the courts have created a number of patent doctrines designed to combat the misuse of continuation applications. In the last ten years, they have changed the term of patents, ended the secrecy of most patent applications, revived the controversial doctrine of written description, and created an entirely new defense of prosecution laches. While these changes have indeed mitigated some of the worst abuses of the continuation process, our data demonstrate that they are not likely to be effective in tackling the core of the problem.

One simple solution to the problems that beset continuations would be to abolish the practice. Part III explores this alternative. In it, we consider the various justifications that have been offered for continuation practice and find many of them wanting. We also consider various complicating factors and potential downsides to abolishing continuations. We conclude from our empirical research that, while there are very real abuses of the system attributable to continuation practice, they may not be so widespread as to justify eliminating continuation practice entirely. Whether continuations should be abolished entirely depends on a judgment concerning the benefit continuations provide to applicants who are legitimately trying to draft effective patent claims.

As alternatives to this drastic remedy, we offer a number of other steps that Congress and the courts could take to restrict abuse of continuations. These steps include requiring publication of all applications, placing a time limit on the addition of new claims that broaden the scope of the patent, and creating a defense for infringers who independently developed the patented invention

⁴ Original applications take on average 1.96 years from their filing to issuance. Continuations, in contrast, take on average 4.16 years. See *infra* notes 27-30 and accompanying text (reciting statistics concerning the average length of the patenting process).

before it was added to the patent claims. At a bare minimum, our data should enable the courts to add some rigor to the new doctrine of prosecution laches by providing a baseline against which to judge the reasonableness of any particular patentee's delay.

I. THE CURIOUS PRACTICE OF CONTINUING PATENT APPLICATIONS

A. *How the System Works*

In order to obtain a patent, an inventor must persuade the PTO that her invention meets the requirements of the patent statute. The inventor files an application, which is examined by the PTO in a process called "patent prosecution." The application contains a written description of the invention and concludes with a number of "claims" that define the scope of the invention.⁵ The inventor must also disclose any "prior art"—other patents or publications that might render the invention unpatentable—of which she is aware, although she has no duty to search for prior art.⁶ The prosecution process is *ex parte*; only the inventor and the patent examiner participate in the decision whether to issue a patent.

The actual process of prosecution is a back-and-forth affair between the applicant and the examiner. Once the inventor files her application, the examiner reviews the application for compliance with the statute and conducts a brief search for prior art.⁷ Based on this analysis, the examiner may decide to

⁵ 35 U.S.C. § 112 (2000). Claims define the scope of the invention, just as a real property deed defines the "metes and bounds" of a real property right. *See, e.g.*, *Regents of Univ. of N.M. v. Knight*, 321 F.3d 1111, 1122 (Fed. Cir. 2003). Unlike land, however, inventions are difficult and perhaps even impossible to define clearly in words. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731 (2002) ("[T]he nature of language makes it impossible to capture the essence of a thing in a patent application."). *See generally* Craig Allen Nard, *A Theory of Claim Interpretation*, 14 HARV. J.L. & TECH. 1 (2000) (discussing attempts by courts to deal with the inherent imprecision of claim drafting). The imprecision of words is further substantiated by the high rate of reversals of claim construction determinations. *See, e.g.*, Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 BERKELEY TECH. L.J. 1075, 1090 (2001) (finding that the Federal Circuit overturned district court claim constructions in between 30% and 39% of the cases); Kimberly A. Moore, *Are District Court Judges Equipped to Resolve Patent Cases?*, 15 HARV. J.L. & TECH. 1 (2001) (demonstrating that the Federal Circuit overturned district court claim constructions in 33% of the cases). The difference between the Moore and Chu statistic on claim construction reversal is due to the fact that Moore classed all Rule 36 summary affirmances as rulings on claim construction, while Chu considered only a certain percentage of Rule 36 affirmances to be related to claim construction.

⁶ 37 C.F.R. § 1.56 (2003) (establishing a duty to disclose information material to patentability).

⁷ Because of the substantial backlog of cases at the PTO, it often takes a year or more after the application is filed before it is first examined. *See* U.S. PATENT & TRADEMARK

allow the claims of the patent as filed.⁸ More likely, however, the examiner will issue a rejection of one or more claims in the application, often based on similarity to the prior art or failure to describe the invention in sufficient detail. The applicant will respond to this rejection and try to persuade the examiner that he is wrong by disclosing information or a declaration showing that the invention is patentable, or by amending the claims of the patent to narrow them and avoid the prior art. The examiner then reviews this response and may either allow the patent claim or issue what is called a “Final Rejection” of the application.

The term “Final Rejection” is a classic legal misnomer.⁹ An applicant faced with a final rejection has several options. First, she can request a face-to-face or telephonic interview with the examiner.¹⁰ Unlike the rest of the prosecution history, which involves written correspondence and is therefore carefully documented, the interview is not transcribed and the interview summary that is

OFFICE, PERFORMANCE AND ACCOUNTABILITY REPORT FOR FISCAL YEAR 2002, at 21, available at <http://www.uspto.gov/web/offices/com/annual/2002/1-58.pdf> (last accessed Jan. 13, 2004) (reporting that, in 2002, the mean time from when the patent application was filed to when the examiner issued her first office action on the application was 16.7 months).

The PTO does not always have access to prior art and examiners have very little time to search for and analyze the prior art. As a result, the examination is far from perfect. See Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1497 (2001) (“[T]he PTO doesn’t do a very detailed job of examining patents.”). One empirical study found that the PTO failed to discover a significant percentage of cases in which two or more inventors applied for a patent on an identical invention, the sort of prior art they should be particularly likely to discover. Mark A. Lemley & Colleen V. Chien, *Are the U.S. Patent Priority Rules Really Necessary?*, 54 HASTINGS L.J. 1299, 1331 (2003). For anecdotal discussion of the failure of the PTO to find relevant prior art, see Jay Kesan & Marc Banik, *Patents as Incomplete Contracts: Aligning Incentives for R&D Investment with Incentives to Disclose Prior Art*, 2 WASH. U. J.L. & POL’Y 23 (2000); Robert P. Merges, *As Many As Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 589 (1999) (noting that generally less than five pieces of prior art are initially cited in a business methods patent).

⁸ First-action allowances are sufficiently rare that patent attorneys generally feel that if they get one, it means they have not asked for broad enough claims. See KINNEY & LANGE, P.A., *INTELLECTUAL PROPERTY LAW FOR BUSINESS LAWYERS* § 3.4.3 (2003). The Kinney & Lange text states:

Patent attorneys generally do not like to have applications allowed when they are first submitted. Such first-action allowances often indicate that the attorney drafted the claims too narrowly and that they could have received more protection for the invention. In fact, some attorneys will try for broader protection for the invention by filing continuation applications if they receive a first-action allowance.

Id.

⁹ See ROBERT P. MERGES ET AL., *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 116 (3d ed. 2003) (“The label ‘final rejection’ is a misnomer if ever there was one.”).

¹⁰ Regarding this procedure, see 37 C.F.R. § 1.133(b) (2002) (setting forth the requisites for an interview with a patent examiner).

completed by the examiner is often cryptic and uninformative.¹¹ It is quite common for an examiner to withdraw a final rejection and allow the claims after such an interview. Second, the applicant may choose to appeal the rejection to the Board of Patent Appeals and Interferences (“the Board”) and, if she loses there, to the U.S. District Court for the District of Columbia or to the U.S. Court of Appeals for the Federal Circuit.¹²

Alternatively, the applicant may choose to start the prosecution process over by filing a continuation application. Under § 120,¹³ an applicant can file such a continuation application at any time before the PTO actually issues the patent or before the applicant abandons the application. Although continuations are commonly filed after a final rejection, they are sometimes filed after allowance as well. This happens either because the applicant wants the allowed claims to issue but also wants to argue for broader claims to be included in later patents, or because the applicant decides instead to abandon the allowed claims and try for broader claims. When a continuation application is filed, the prosecution process we have just described starts over. The continuation application is treated just like a new application,¹⁴ giving the applicant another set of chances to persuade the examiner to allow the claims, to further amend the claims, or even to hope to get a different examiner.¹⁵ If none of this works, the applicant can file yet another continuation application, and so on ad infinitum. There is no way an examiner can ever cause a determined applicant to go away, although allowing the applicant’s patent claims increases the chance that the case will finally be disposed of.

¹¹ In the *Manual of Patent Examining Procedure*, section 713.04 explains that examiners must fill out interview summaries to be included in the prosecution history if they meet with the applicant. MANUAL OF PATENT EXAMINING PROCEDURE § 713.04 (2001) [hereinafter MANUAL]. In our experience reviewing prosecution histories, however, this “interview summary” is rarely more than a sentence and often says nothing more than “Claims 1-11 are in condition for allowance.”

¹² See 35 U.S.C. § 134 (2000) (outlining when a party may seek a Board appeal); 35 U.S.C. § 141 (2000) (permitting appeals of Board decisions to the Federal Circuit); 35 U.S.C. § 145 (2000) (permitting appeals of Board decisions to the U.S. District Court for the District of Columbia).

¹³ 35 U.S.C. § 120 (2000) (allowing continuations to use the filing date of the original patent application).

¹⁴ A new procedure, the Request for Continued Examination (“RCE”), works in the same way as the § 120 continuation application except that the applicant does not have to file an entirely new application, but can instead request continued prosecution of the existing application upon the payment of a fee. Because the RCE process is relatively new, none of the cases in our study result from RCEs rather than § 120 continuations. Nonetheless, for purposes of our discussion in this article, the two can be treated interchangeably.

¹⁵ Examiner turnover is notoriously high because of the low salaries and high workloads at the PTO. See MERGES ET AL., *supra* note 9, at 606-07 (discussing the high turnover at the PTO).

B. *The Use of Continuation Practice*

Continuations are widely used in today's patent system.¹⁶ The results of our comprehensive study of patent continuations shows that 23% of all patents granted from 1976 through 2000 claim priority to one or more previously filed applications.¹⁷ Although there has been some fluctuation over the years in the number of continuation patents filed, the trend has been a steady increase. In the mid-1970s, about one-fifth of all issued patents were based on continuations.¹⁸ By the mid-1990s the number of patents issued based on continuation applications climbed to 31%. That number has declined somewhat in the last several years, in part because of changes in the way patent term is calculated,¹⁹ but continuation patents still constitute about one-quarter of all issued patents. Continuations are a major part of patent practice. They are especially important in certain industries, particularly pharmaceuticals and biotechnology.²⁰ In those industries, most patent lawyers with an important application try to keep at least one continuation application pending in the PTO well after a patent issues so that they can track changes in the marketplace.²¹

The effect of these continuations is substantial. Recent work by Cecil Quillen and others shows that when continuations are taken into account, the PTO issues patents on over 85% of the application chains that are filed.²²

¹⁶ See *Symbol Techs., Inc. v. Lemelson Med. Ed. & Res. Found.*, 277 F.3d 1361, 1369 (Fed. Cir. 2002) (Newman, J., dissenting) (calling continuation practice "ubiquitous").

¹⁷ Because our data set ends in 2000, all of the patents we study here rely on § 120 continuations, as opposed to CPA or RCE continuations.

¹⁸ In 1976, 1977, 1978, and 1979, the percentage of issued patents that were continuations was 23%, 22%, 21%, and 21%, respectively.

¹⁹ See *infra* notes 82-83 and accompanying text (discussing the change in the calculation of a patent term to a system of counting twenty years forward from the date of initial filing).

²⁰ See John R. Allison & Mark A. Lemley, *Who's Patenting What? An Empirical Exploration of Patent Prosecution*, 53 VAND. L. REV. 2099, 2125, 2154 tbl.9 (2000) (finding that while the average patent in 1996-1998 issued from 1.50 applications, the average pharmaceutical patent issued from 2.27 applications and the average biotechnology patent from 2.38 applications).

²¹ See Harold Wegner, *The End of Equivalents? Examining the Fallout from Festo*, 13 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 727, 742 (2003). Wegner explains:

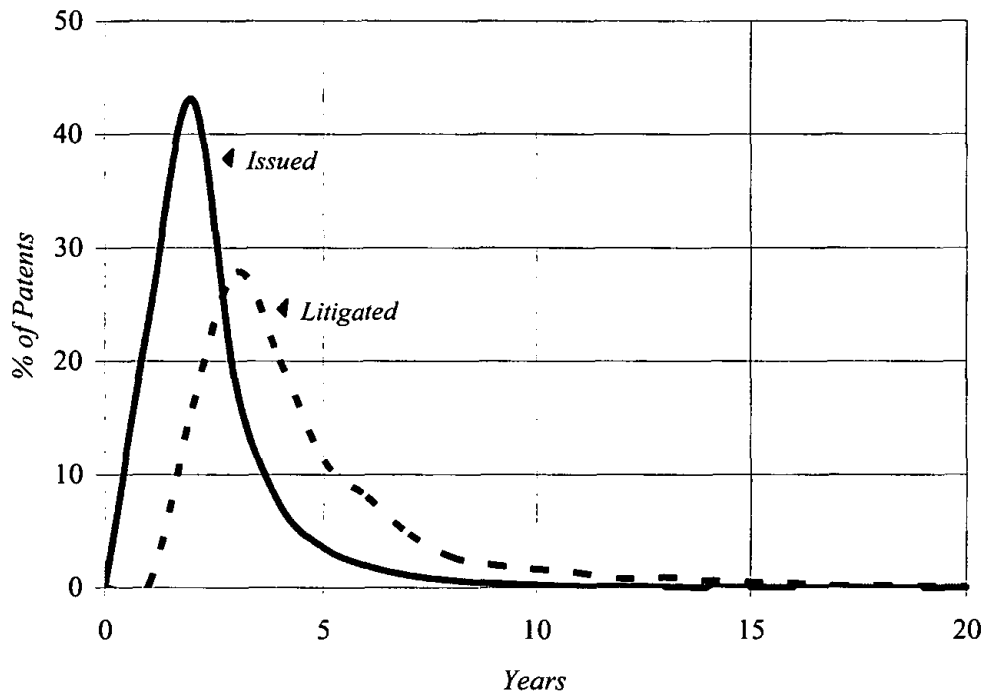
[Y]ou take whatever claims you can, you file a continuation with a disclaimer, and then you keep that new case pending forever and ever and ever, and then you add claims when you need them. Now, that is not a very good public policy. But, it is something that is an effective way to deal with the problem. We do it all the time.

Id.

²² Cecil D. Quillen, Jr. et al., *Continuing Patent Applications and Performance of the U.S. Patent and Trademark Office—Extended*, 12 FED. CIR. B.J. 35, 38 (2002). Quillen and Webster had originally estimated in earlier work that the grant rate was 95%. Cecil D. Quillen, Jr. & Ogden H. Webster, *Continuing Patent Applications and Performance of the U.S. Patent and Trademark Office*, 11 FED. CIR. B.J. 1 (2001). This earlier work was properly criticized for failing to take account of cases in which multiple patents issue from a

Patents that issue from continuation applications, or from families in which continuations are filed, are also substantially more likely to be litigated than patents that issue directly from original applications.²³ While continuations are filed in 23% of all patent applications, patents based on continuation applications represent 52% of all litigated patents. Although continuations are used in a minority of all patents, it is the most important minority because it is the minority most likely to end up in litigation.²⁴ Figure 1 shows the time spent in prosecution (from earliest priority date to issuance) for issued and

Fig. 1: Prosecution Times



family of continuation applications. On the other hand, some of the critics made equally unrealistic assumptions—for example, that every continuation filed results in a separate patent. See Robert A. Clarke, *U.S. Continuity Law and Its Impact on the Comparative Patenting Rates of the U.S., Japan and the European Patent Office*, 85 J. PAT. & TRADEMARK OFF. SOC'Y 335, 338 (2003) (erroneously assuming that every continuation resulted in a patent and concluding that the grant rate was 75%). The 85% number provided in the revised Quillen et al. study is based on actual data about the applications that issue based on continuations, and reflects the best estimate we have of how often applications mature into patents.

²³ See John R. Allison et al., *Valuable Patents*, 92 GEO. L.J. (forthcoming 2004) (finding that litigated patents filed more than three times as many continuation applications as non-litigated patents, and also came from substantially larger families of patents).

²⁴ See *id.* (explaining that litigated patents are a subset of all valuable patents).

litigated patents.²⁵

II. THE PROBLEMS WITH CONTINUATION APPLICATIONS

While it is certainly odd to an outsider that the PTO has no power to ever terminate a patent prosecution, the fact that a rule looks odd is not necessarily a reason to do away with it. This is particularly true in patent law, which has no shortage of odd rules.²⁶ Continuation practice, however, has a number of pernicious consequences for the patent system. Those harmful consequences fall into five categories.

A. Problems Created By Continuations

1. Delay and Uncertainty

Continuations take time. Even if the patentee does not intend to delay the issuance of a patent,²⁷ starting the prosecution process over naturally adds significantly to the time a patent application spends in prosecution. During the period of our study, prosecution took an average of 2.47 years from the earliest claimed filing date to issuance date. Figure 2 below plots the time applications spent at the PTO by year in terms of their application time (time from filing date to issuance) and their prosecution time (time from earliest claim of priority to issuance). As Figure 2 indicates, the mean time patent applications spend at the PTO has been on the rise in recent years. In fact, the application time reached the highest point of the twenty-five-year study during 2000. The prosecution time (time from earliest claim of priority) has risen even more dramatically in recent years due to the increase in the number of continuation patents.²⁸ Original patent applications that issue take an average of 1.96 years to issue, while patents with at least one continuation take an average of 4.16 years to issue. Indeed, some patent prosecutions with multiple continuations

²⁵ The timeline of Figure 1 has been abbreviated so that the difference between litigated and issued patents can be observed. In actuality, the timeline continues to sixty-eight years—the longest prosecution time for any of the issued patents.

²⁶ To take just one example, the U.S. Supreme Court has held that a single individual wearing underwear (beneath her clothing) is engaged in “public use” of that underwear barring a patent, but that a road in central Boston traversed by people for six years was not in public use. *Compare* *Egbert v. Lippmann*, 104 U.S. 333, 338 (1881) (holding that more than two years of wearing a corset constituted public use), *with* *City of Elizabeth v. Nicolson Pavement Co.*, 97 U.S. 126, 134-35 (1877) (holding that allowing the public to use an experimental road surface for six years was not a public use).

²⁷ On intentional delay, see *infra* notes 60-66 and accompanying text (discussing “submarining” as a tactic involving intentional delays on patenting).

²⁸ Figure 1 shows the increase in mean years spent in prosecution. This increase is attributable to increased use of continuation practice. See *supra* notes 22-25 and accompanying text (attributing part of the increase in years spent in prosecution to continuation practice).

take decades to issue.²⁹ For example, U.S. Patent No. 5,966,457 claimed priority to 21 different applications and its total prosecution spanned more than forty-four years. Table 1 shows the distribution of patents as measured by the length of their prosecution from their earliest claims of priority to their issuance.³⁰

Moreover, continuation applications themselves do not take significantly less time to prosecute than original applications. Intuitively, one might think that the examination time ought to decrease with each continuation since the examiner is, in theory, already familiar with the application, the prior art, and the applicant's claims. This intuition is not accurate. Patents based on one or more continuations take on average 1.86 years from the filing date of the continuation to the grant date. Patents with no earlier claims to priority (original applications) take on average 1.96 years from filing date to grant date—just thirty-six days longer. The fact that there is negligible efficiency associated with continuation examination—that prosecution takes no less time the second time around—could be due to examiner turn-over, heavy examiner caseloads,³¹ or the small number of hours that examiners spend on each application over the course of several years.³²

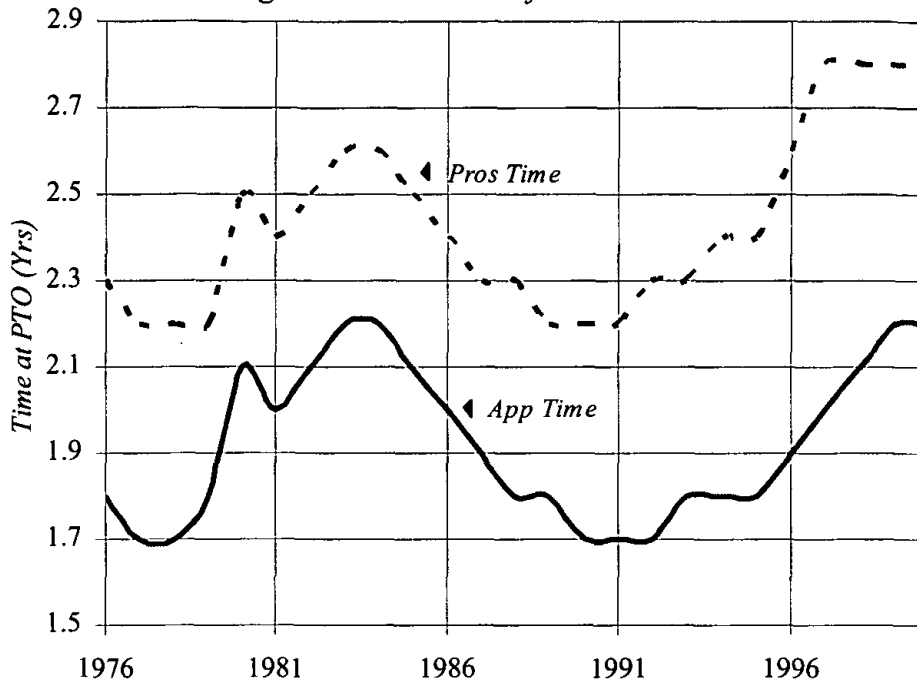
²⁹ Of course, there are a few original patent applications that take decades to issue as well, but this is due to secrecy restrictions, interferences, or Board, district court, or Federal Circuit appeals. *See, e.g.*, U.S. Patent No. 5,132,080 (an original application was filed November 28, 1944 and the patent was not permitted to issue until July 21, 1992 due to secrecy restrictions); U.S. Patent No. 6,097,812 (filed July 25, 1933 and delayed due to secrecy until August 1, 2000); U.S. Patent No. 6,130,946 (filed October 23, 1936 and delayed due to secrecy until October 10, 2000). Pursuant to 35 U.S.C. § 181, the Commissioner of the PTO must withhold the granting of any patent “[w]henever publication or disclosure . . . by the grant of a patent on an invention in which the Government has a property interest might, in the opinion of the head of the interested Government agency, be detrimental to the national security.” 35 U.S.C. § 181 (2000). Although § 181 only permits the Commissioner to delay patent issuance for up to one year, the secrecy can be renewed for an unlimited number of one-year periods if it is in the interest of national security. *Id.*

³⁰ *See* Table 1, *infra* Appendix A. The earliest claim to priority is measured as the earliest claim to a related application on the front face of the patent. This would include continuations, *see* 35 U.S.C. § 120 (2000), continuations-in-part, *see id.*, and divisionals, *see* 35 U.S.C. § 121 (2000). It does not include foreign claims to priority under 35 U.S.C. § 119 or PCT claims (priority claims based upon the Patent Cooperation Treaty). Foreign priority claims under § 119 could delay prosecution up to one additional year and PCT claims could delay prosecution another thirty months.

³¹ *See, e.g.*, Eugene R. Quinn, Jr., *The Proliferation of Electronic Commerce Patents: Don't Blame the PTO*, 28 RUTGERS COMPUTER & TECH. L.J. 121, 123 (2002) (“[P]atent examiners are simply too overworked”); John R. Thomas, *The Question Concerning Patent Law and Pioneer Inventions*, 10 HIGH TECH. L.J. 35, 100 (1995) (referring to examiners as “notoriously overworked”); Simson Garfinkel, *Patently Absurd*, WIRED, July 1994, at 104; Flavio Rose, *Patent Truths*, L.A. LAW., Oct. 2001, at 40.

³² Although it varies by technology, examiners spend on average eighteen hours on each patent application from start to finish. Lemley, *supra* note 7, at 1496 n.3. During those

Fig. 2: Time at PTO for Issued Patents



The delays caused by continuation practice create significant uncertainty among competitors. Patent applications filed before 2000 were kept secret unless and until they issued as patents. As a result, competitors could not know whether patent applications were pending that might cover their products. The passage of time might reduce the risk that a patent would be issued covering a particular technology, but it could never eliminate that risk. Indeed, Stuart Graham has theorized that the use of continuations may be valuable to patentees precisely because it permits them to maintain secrecy while simultaneously benefiting from patent protection.³³ Further, if we accept the repeated statements of courts and commentators that disclosure is a central function of the patent system,³⁴ the delay in that disclosure is itself problematic

eighteen hours, the examiner must review the patent application, conduct a search of the prior art, compare the prior art to the claims sought, and issue at least one (and usually more) office actions either allowing or rejecting the claims. When examiners only spend eighteen hours on applications and those eighteen hours are spread over nearly two years, it is not surprising that a continuation takes almost as much time as the original application.

³³ Stuart J.H. Graham, *Hiding in the Patent's Shadow: Firms' Use of Secrecy to Capture Value from New Discoveries*, in CONTINUATION, COMPLEMENTARITY, AND CAPTURING VALUE: THREE STUDIES EXPLORING FIRMS' COMPLEMENTARY USES OF APPROPRIABILITY MECHANISMS IN TECHNOLOGICAL INNOVATION (forthcoming 2004) (discussing the strategic uses of continuations, one of which is to maintain secrecy).

³⁴ See, e.g., *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 736 (2002) (mentioning that "patent rights are given in exchange for disclosing the invention to the public"); see also *J.E.M. AG Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc.*, 534 U.S. 124,

for society.

2. Wearing Down the Examiner

Prosecutions involving one or more continuations are more complex than other sorts of prosecutions.³⁵ The applicant spends more time before the PTO and the examiner has more chances to evaluate the application and the prior art. This might be a good thing; if the examiner has more time to spend with an application, we might expect him to do a better job in deciding whether to issue it as a patent.³⁶ The key question is whether a more extensive patent prosecution translates into a more rigorous evaluation of the application by the PTO. There are reasons to be skeptical. Patent examiners have notoriously heavy caseloads,³⁷ and they are rewarded only for an initial response to a patent application and for finally disposing of an application.³⁸ As a result, an examiner has no incentive to spend more time on harder cases. Quite the contrary.³⁹ There is reason to worry, therefore, that when reviewing patents

142 (2001) (“The disclosure required by the Patent Act is the *quid pro quo* of the right to exclude.”); *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150-51 (1989); *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 481 (1974); *W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983) (“Early public disclosure is a linchpin of the patent system.”). Economists and legal scholars have also argued that disclosure is a key function of the patent system. *See, e.g.*, Donald S. Chisum, *Anticipation, Enablement, Obviousness: An Eternal Golden Braid*, 15 AIPLA Q.J. 57 (1987) (stating that disclosure is “a primary purpose” of the enablement requirement); Suzanne Scotchmer & Jerry Green, *Novelty and Disclosure in Patent Law*, 21 RAND J. ECON. 131 (1990) (assessing the costs and benefits of the patent system by relying on the value of disclosure).

³⁵ *See* John R. Allison & Mark A. Lemley, *The Growing Complexity of the U.S. Patent System*, 82 B.U. L. REV. 77, 80-81 (2002) (finding that patents that issue from continuation applications also tend to include more claims, cite more prior art, spend more time in the PTO, and have more inventors than patents that issue from the initial application).

³⁶ Allison & Lemley call this the “patent value” theory—important patents are worth a more rigorous examination. *Id.* at 139-41. By contrast, it does not make sense to subject all applications to a rigorous examination. Lemley, *supra* note 7, at 1495, 1497 (arguing that the PTO should not subject all applications to the same level of rigorous examination).

³⁷ *See, e.g.*, sources cited *supra* note 31 (discussing the heavy work-load on patent examiners).

³⁸ For a full discussion of the difficulties with the examiner incentive system, see MERGES ET AL., *supra* note 9, at 600-03 (discussing the PTO’s examination budget); Arti K. Rai, *Addressing the Patent Gold Rush: The Role of Deference to PTO Patent Denials*, 2 WASH. U. J.L. & POL’Y 199, 218 (2000) (arguing for a change in the current patent examiners’ incentive system to encourage them to grant patents); John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, 2001 U. ILL. L. REV. 305, 324 (discussing the lack of trained patent examiners in high-tech fields).

³⁹ Data do suggest that the PTO takes longer to issue more complex applications. A simple OLS regression showed that the number of claims and prior art references cited significantly impacted the time it took to prosecute applications. However, in each case, the impact was slight (each additional claim beyond the mean of 12.47 increases prosecution

with multiple claims and a lot of prior art, the PTO will pay less (not more) attention to each claim or piece of prior art. An applicant's ability to file continuation applications and draw the process out further exacerbates the problem. Since an examiner can only finally dispose of an application by allowing it, an examiner faced with a determined applicant has every incentive to give in and allow the patent.⁴⁰ This is especially likely since the patents that involve the most continuation applications tend to be those with more claims and more prior art than average⁴¹—that is, the very patents the examiner least wants to see again. Alternatively, if an applicant is faced with a determined examiner, continuation practice may allow the applicant to “wait out” the examiner and hope that the new application will be assigned to a different examiner, perhaps because the original one has quit. “Examiner-shopping” is a common practice, but the Federal Circuit has recently taken some steps to limit its abuse.⁴²

If continuation applications permit the applicant to wear down the examiner—obtaining a patent that the PTO would otherwise refuse to grant—they give applicants with dubious claims to ownership intellectual property rights that they can enforce against the world. It is inevitable that the PTO will make mistakes.⁴³ But continuation applications may be more likely than average to result in bad patents. This is particularly troublesome for society because our empirical evidence suggests that patents based on continuation

time by 1.66 days and each additional U.S. patent prior art reference cited above the mean of 7.83 increases prosecution 2.08 days). It does not follow, however, that examiners spend more time reviewing those applications. They may simply put off the hardest tasks, concentrating first on applications that are easier to dispose of. *Cf.* DAVID POPP ET AL., TIME IN PURGATORY: DETERMINANTS OF THE GRANT LAG FOR U.S. PATENT APPLICATIONS (Nat'l Bureau of Econ. Research, Working Paper No. 9518, 2003), *available at* <http://www.nber.org/papers/w9518> (last accessed Jan. 13, 2004) (examining the patent characteristics that impact grant lag).

⁴⁰ See Allison et al., *supra* note 23. Allison and others suggest that the PTO should change its internal processes to enable examiners to spend more time on complex applications. *Id.*

Some commentators have suggested to us that examiners might actually prefer continuation applications, since they have already learned the technology and can get disposal credits without having to do as much work. The long delay associated with continuation applications belies that claim; it scarcely seems credible that an examiner will remember enough about a case nearly two years after she last dealt with it to result in a significant time savings.

⁴¹ *Id.*

⁴² See *Dayco Prods. v. Total Containment*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) (holding that taking an application to a new examiner without disclosing that a different examiner had already rejected the claims was inequitable conduct).

⁴³ See Lemley, *supra* note 7, at 1495 (describing the costs of trying to weed out all bad patents).

applications are far more likely to be litigated than other sorts of patents.⁴⁴ As a result, mistakes in issuing continuation patents are much more likely to impose social costs than mistakes with other sorts of patents.

3. Changing Claims

While some applicants file continuation applications in order to have a further opportunity to persuade the PTO to issue the claims they originally sought, others file continuation applications in order to have an opportunity to modify their claims. Applicants might want to modify their claims after filing for a variety of reasons. Some are innocuous—the applicant may simply have drafted the claims poorly in the first instance and want a second chance at drafting claims of appropriate scope. Other explanations, however, are more problematic. Inventors can keep an application pending in the PTO for years, all the while monitoring developments in the marketplace. They can then draft claims that will cover those developments.⁴⁵ In the most extreme cases, patent applicants add claims during the continuation process to cover ideas they never thought of themselves but instead learned from a competitor.⁴⁶ The most egregious and notorious example of submarine patenting is Jerome Lemelson.⁴⁷ Lemelson filed eight of the ten continuation patents with the longest delays in prosecution in our study. Those Lemelson patents spent

⁴⁴ Although 23% of all issued patents are based on continuations, 52% of all litigated patents are based on continuations.

⁴⁵ See, e.g., MERGES ET AL., *supra* note 9, at 116. Merges et al. explain:

[P]atent lawyers often file a continuation application just prior to the issuance of a patent, so that prosecution based on the original disclosure may continue. This is valuable where a competitor may attempt to design around a patent by adopting minor variants. In that event, it may be possible to revise the continuation application claims to cover the competitor's new variant, considerably enhancing the effective scope of the patent.

Id.

⁴⁶ For example, in *Chiron Corp. v. Genentech, Inc.*, 268 F. Supp. 2d 1148 (E.D. Cal. 2002), the plaintiff filed a patent application covering monoclonal antibodies in 1984, a time when the technology was in its infancy. It kept various applications pending in the PTO until 1999, when it drafted new claims designed to cover not just monoclonal antibodies as they were understood in 1984, but new types of antibodies developed in the intervening 15 years, including those invented by the defendant. *Id.* at 1151-52. Another example is *Gentry Gallery, Inc. v. Berklene Corp.*, 134 F.3d 1473 (Fed. Cir. 1998). The patentee there amended his claims to a reclining chair to claim placing the controls for that chair in a position he never thought of, but saw for the first time on his competitor's product. *Id.* at 1479 ("Sproule admitted at trial that he did not consider placing the controls outside the console until he became aware that some of Gentry's competitors were so locating the recliner controls.").

⁴⁷ For discussion of Lemelson's patent tactics, see James W. Morando & Christian H. Nadan, *Silent Enemies*, RECORDER, May 4, 1994, at 10 (discussing submarining tactics in software patenting).

anywhere from thirty-eight to more than forty-four years in the PTO.⁴⁸

The Federal Circuit has made it clear that the law permits the drafting of claims written during prosecution specifically in order to cover a competitor's products. In *Kingsdown Medical Consultants v. Hollister*,⁴⁹ the court explained:

It should be made clear at the outset of the present discussion that there is nothing improper, illegal or inequitable in filing a patent application for the purpose of obtaining a right to exclude a known competitor's product from the market; nor is it in any manner improper to amend or insert claims intended to cover a competitor's product the applicant's attorney has learned about during the prosecution of a patent application. Any such amendment or insertion must comply with all statutes and regulations, of course, but, if it does, its genesis in the marketplace is simply irrelevant and cannot of itself evidence deceitful intent.⁵⁰

To be sure, applicants do not simply have carte blanche to rewrite their claims. The new claims must find adequate support in the original application. If not, the patent will be invalid for lack of enablement or written description,⁵¹ or alternatively, the new claims will be considered "new matter" invented only as of the date the claims were added.⁵² If the patentee can find some support in the original patent application for the current claims, however, she can obtain legal rights over ideas that (at least in that form) never occurred to her until she saw what others were already doing.

It makes some sense for the law to permit correction of claim drafting errors. Words are notoriously imperfect at defining inventions.⁵³ But we do not need

⁴⁸ Some of Lemelson's patents and their delays are as follows: U.S. Patent No. 5,966,457 (21 related applications, 44.33 years in prosecution); U.S. Patent No. 5,570,992 (30 related applications, 42.28 years in prosecution); U.S. Patent No. 5,491,591 (8 related applications, 40.67 years in prosecution); U.S. Patent No. 5,351,078 (12 related applications, 39.76 years in prosecution); U.S. Patent No. 5,283,641 (11 related applications, 39.11 years in prosecution); U.S. Patent No. 5,281,079 (29 related applications, 39.50 years in prosecution); and U.S. Patent No. 5,249,045 (10 related applications, 38.76 years in prosecution).

⁴⁹ 863 F.2d 867 (Fed. Cir. 1988).

⁵⁰ *Id.* at 874; *accord* *State Indus., Inc. v. A.O. Smith Corp.*, 751 F.2d 1226, 1235 (Fed. Cir. 1985) (finding it proper to keep track of one's competitor's products and modify one's patent claim in light of those products).

⁵¹ This was the fate of the claim changes in *Gentry Gallery, Inc.*, 134 F.3d at 1479 (holding claim invalid for lack of written description), and *Chiron Corp.*, 268 F. Supp. 2d at 1166 (denying Chiron's motion for judgment as a matter of law because the "parent applications fail[ed] to meet the written description requirement").

⁵² 35 U.S.C. § 132(a) (2000) ("No amendment shall introduce new matter into the disclosure of the invention.").

⁵³ *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731 (2002) ("[T]he nature of language makes it impossible to capture the essence of a thing in a patent application."). *See generally* Nard, *supra* note 5 (discussing the different theories of claim

continuation practice in order to achieve this goal. Instead, a patentee dissatisfied with her claims can rewrite those claims in a reissue proceeding.⁵⁴ A patentee may seek a reissue at any time to narrow her claims, or within two years of the original issue date if she wishes to broaden them.⁵⁵ In addition, the doctrine of equivalents exists to prevent a patent owner from losing effective protection because she did not draft claims that effectively cover what she invented.⁵⁶ That doctrine permits a patentee to argue that an accused infringer's device should be adjudged infringing, even though it does not literally fit within the language of the claims, because the differences between the claims and the accused device are "insubstantial."⁵⁷ Together, these doctrines are sufficient to solve any legitimate problems with poorly drafted claims.

Permitting patentees to change claims to track competitor's products invites abuse of the system.⁵⁸ This practice seems fundamentally unfair, since a competitor who was legitimately the first to invent a particular device or process may be held to have infringed on a patent claim written after (and indeed because of) that invention. It also seems inconsistent with the fundamental economic justification for the patent system, which is to encourage new inventions. As commentators have noted, the patent system must balance encouraging pioneering inventions and encouraging improvements.⁵⁹ Strategic claim changes may hold-up legitimate improvers or

interpretation that the Federal Circuit has adopted to deal with the inherent ambiguity of language).

⁵⁴ 35 U.S.C. § 251 (2000) (providing a patentee the right to have her patent reissued so long as she does not seek to broaden her claims after more than two years).

⁵⁵ *Id.*

⁵⁶ See *Graver Tank & Mfg. Co. v. Linde Air Prods.*, 339 U.S. 605, 608-09 (1950) (holding that the doctrine of equivalents prevents alleged infringers from achieving the benefit of inventions by obtaining the same result using a device that performs substantially the same function in substantially the same way).

⁵⁷ See *Hilton Davis Chem. Co. v. Warner Jenkinson Co.*, 62 F.3d 1512, 1518 (Fed. Cir. 1995) (en banc) (holding that the application of the doctrine of equivalents depends on the substantiality of the differences between claimed and accused products), *rev'd on other grounds*, 520 U.S. 17 (1997).

⁵⁸ Regarding the general problem of abusive intellectual property litigation entered into in order to hold-up competitors, see Michael J. Meurer, *Controlling Opportunistic and Anticompetitive Intellectual Property Litigation*, 44 B.C. L. REV. 509 (2003) (analyzing two methods of controlling rent-seeking costs associated with opportunistic and anticompetitive intellectual property lawsuits).

⁵⁹ See, e.g., Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989 (1997) (describing the difficult distinction between improvers and imitators); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 843 (1990) ("[O]ur approach . . . is a broadening of what counts as an incentive to invent or as a social cost of issuing patents."); Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSP. 29, 30 (1991) (highlighting difficulties in the optimal allocation of rights between

independent inventors, reducing their ability and incentive to innovate.

4. Submarine Patents

A related problem to changing claims is intentional delay in the issuance of patents designed to take a mature industry by surprise. A number of patentees have used the continuation process to delay the issuance of their patents indefinitely. By doing so, they obtain a patent that may be more valuable than one that issued in the early stages of a new industry. This value may come from the growth of the market over time: the broad patents the Wright brothers obtained on aircraft would presumably bring in more revenue if in force today than they did one-hundred years ago.⁶⁰ Alternatively, the value may come from the ability to capture specific investments made by competitors who assumed with the passage of time that a technology was in the public domain. Once a semiconductor company has invested two- to four-billion dollars in a new fab,⁶¹ it will be willing to pay more for the right to use that fab than if approached for a license *ex ante*.⁶² Intentional delay to increase the value of the resulting patent is referred to as “submarine patenting” because the patents surface unexpectedly and take competitors by surprise.

Submarine patenting depends heavily on continuation practice. Without the ability to abandon and refile applications an unlimited number of times, even in the face of a decision by the PTO to allow the patent, submarine patentees

pioneers and improvers).

⁶⁰ On the Wright brothers’ patents and their litigation, see Richard P. Hallion, *The Wright Brothers: How They Flew*, 19 AM. HERITAGE INVENTION & TECH., available at <http://www.inventionandtechnology.com/2003/02/wright.shtml> (last accessed Jan. 13, 2004) (tracing the Wright brothers’ technological achievements during the development of their plane).

⁶¹ See Steve Lohr, *World-Class Chip, but a Fragile Business*, N.Y. TIMES, Aug. 4, 2003, at C1 (stating that fabs cost two- to three-billion dollars each); Mark LaPedus, *Leading-edge Fab Costs Soar to \$4 Billion*, at <http://www.siliconstrategies.com/story/OEG20030310S0067> (last accessed Nov. 3, 2003) (estimating cost of a next-generation semiconductor fab at four-billion dollars).

⁶² This is not simply because the semiconductor company fails to understand the economic concept of sunk costs, though surprisingly few people do. Before investment, the semiconductor company likely faces a choice of alternative technologies, and the value of a patent on one of those alternatives is constrained by the ability to choose the other. By contrast, once a large investment has been made in using the patented technology, it will often become uneconomical to switch to the other technology. As a result, the patentee will have substantial bargaining power if the patent is not disclosed until after the investment has been made. An analogous problem arises where patent owners withhold information from standard-setting organizations in an effort to encourage that investment. See generally Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CALIF. L. REV. 1889 (2002) (examining the effect of standard-setting organizations on intellectual property rights); Mark R. Patterson, *Inventions, Industry Standards, and Intellectual Property*, 17 BERKELEY TECH. L.J. 1043 (2002) (exploring options for changing the existing law to avoid this problem).

like Jerome Lemelson would not be able to delay the issuance of their patents. Submarine patenting also depended significantly on two other long-standing rules in U.S. patent law that have now been modified: the fact that a patent, once issued, lasted for seventeen years from the date of issue regardless of when it was filed, and the fact that applications were kept secret until they issued as patents. Secrecy permitted submarine patents to surprise the industry, and the invariability of the patent term meant that the patentee did not give up any protection by delaying issuance of the patent. Both rules were changed in the 1990s. Congress changed the patent term in 1995 from seventeen years from issue to twenty years from the filing of the first application.⁶³ As a result, every year a patentee delays prosecution of its application is a year of protection lost. In 1999, Congress required publication of many (though not all) patent applications eighteen months after the application is filed.⁶⁴ This makes secrecy of submarine patents difficult to maintain. While these legislative changes have significantly ameliorated the problem of submarine patents for applications filed after 1995, they have not eliminated the problem entirely, as we discuss below.

There is no social benefit whatsoever to submarine patents. They extend the effective life of patents, permit patentees to hold-up competitors who have made investments in plant capacity, and upset the settled expectations of manufacturers in a variety of industries. They do nothing to encourage innovation and indeed, on balance, they probably discourage it.⁶⁵ Abolishing continuations would make it far more difficult to engage in submarine patenting.⁶⁶

⁶³ 35 U.S.C. § 154(a)(2) (2000). The statute states:

[A] grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed . . . or, if the application contains a specific reference to an earlier filed application or applications . . . from the date on which the earliest such application was filed.

Id.

⁶⁴ 35 U.S.C. § 122(b)(1)(A) (2000) (“[E]ach application for a patent shall be published . . . promptly after the expiration of a period of 18 months from the earliest filing date for which a benefit is sought under this title.”)

⁶⁵ Transferring revenues to a patentee will increase the reward to patenting, but it will not necessarily support innovation. It may instead support the activities of “inventors” like Jerome Lemelson, whose primary focus was in drafting patents rather than promoting the progress of the useful arts.

⁶⁶ Submarine patentees might also delay issuance of patents by provoking interferences (administrative trials between two or more applicants who claim to have invented the same thing) or by using the internal PTO appeals process rather than continuations to challenge rejections. Both approaches are risky, though, because they may result in a loss of all patent rights and because, at least in the Federal Circuit, the patentee will have an adversary arguing against patentability. Before the Board, by contrast, the examiner is entitled to write a brief defending her decision, but often fails to do so and in any event does not argue the case to the Board. Unlike someone using continuations, the loser in an appeal or interference cannot simply refile and try again.

5. Evergreening

A final problem with continuation applications is that they can result in multiple patents covering the same invention. Patentees regularly use continuation applications not just to fight repeatedly for the issuance of a single patent, but also to obtain a narrow patent relatively quickly while continuing to argue for a broader one.⁶⁷ Of the more than two-million patents in our dataset, 23.3% claim priority to one or more earlier filed applications and 42.3% of these patents with earlier claims of priority had at least one other patent in the chain issue.⁶⁸ Continuation applications are an important part of this practice because they permit a patentee to claim the same priority date for both patents, thus avoiding having one patent serve as prior art invalidating the other.⁶⁹ This practice is known as “double patenting,” and the law has evolved a complex set of rules to deal with it. Stripped to its essence, the rule is that a patentee cannot obtain two or more patents that cover precisely the same thing.⁷⁰ A second patent that covers precisely the scope of the first is invalid for double patenting, even if they stem from the same application. By contrast, if the second patent is not precisely the same as the first, but covers an invention that would be obvious (and therefore unpatentable) in view of the first, the rule is different. The doctrine of “obviousness-type double patenting” permits the grant of two or more patents to the same inventor,⁷¹ but requires that the patents expire on the same day in order to prevent the extension of

⁶⁷ See MERGES ET AL., *supra* note 9, at 116 (“Typical prosecution strategy is to take the bird in the hand and fight over the contested claims separately.”); Wegner, *supra* note 21, at 742 (suggesting that patentees do this “all the time”).

⁶⁸ The Quillen et al. study found that 31% of the patents that issued based on a continuation application also had a patent issue from the parent application. Quillen et al., *supra* note 22, at 38 (discussing this finding). The study was based on a sample of only 1000 patents, while the data presented in this study has been compiled from all 2,224,379 issued patents from 1976-2000. Cf. Allison et al., *supra* note 23 (observing that, while non-litigated patents each had on average only 0.22 “relatives” (other patents issued from applications in the same family chain), litigated patents each had 0.85 relatives on average).

⁶⁹ An issued patent can invalidate a subsequently filed application if it issues more than a year before the new application is filed. See 35 U.S.C. § 102(b) (2000) (stating that a patent can be denied if “the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent”).

⁷⁰ See *infra* note 92 (discussing the rules of double patenting).

⁷¹ If inventorship is not the same but overlapping, two different patents are generally treated as unrelated. An important exception is 35 U.S.C. § 103(c) (“Subject matter developed by another person . . . shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person”), which was amended in 1984 to provide that if different inventors work for the same company, their unpublished inventions will not be prior art against each other for purposes of finding the later invention obvious. *Id.*

patent rights beyond the lawful term of the first patent.⁷² The law has traditionally accomplished this by having the patentee disclaim part of the term of the second patent,⁷³ but with the shift to a patent term measured from the first filing date, the problem will generally take care of itself.

While the doctrine of obviousness-type double patenting solves the worst problem with obtaining multiple patents, double patenting has still had harmful consequences in the pharmaceutical industry. Under the Hatch-Waxman Act, a pharmaceutical patent owner is entitled to list its patents with the FDA in the "Orange Book."⁷⁴ A generic company that wants permission from the FDA to make a drug covered by a patent in the Orange Book must certify that the patent is invalid or that the drug will not infringe the patent.⁷⁵ Once the generic makes such a certification, the patent owner can sue the generic for infringement and obtain an automatic thirty-month stay preventing the generic from entering the market.⁷⁶ Pharmaceutical patent owners have used the continuation process to obtain multiple patents covering obvious variants of the same drug, and have listed each of those patents in the Orange Book at different times.⁷⁷ The result has been that the pharmaceutical company could obtain not one, but many sequential thirty-month stays. This practice is known as "evergreening."⁷⁸ It serves no useful social purpose and reflects a rather

⁷² *In re Goodman*, 11 F.3d 1046, 1052 (Fed. Cir. 1993) ("To prevent extension of the patent right beyond statutory limits, the doctrine of obviousness-type double patenting rejects application claims to subject matter different but not patentably distinct from the subject matter claimed in a prior patent.").

⁷³ *Ortho Pharm. Corp. v. Smith*, 959 F.2d 936, 940 (Fed. Cir. 1992) ("Unlike 'same-invention' double patenting, obviousness-type double patenting can be overcome by filing a terminal disclaimer.").

⁷⁴ 21 U.S.C. § 355(j)(7)(A)(iii) (2000) (permitting patent information "respecting a drug included on the list" to be published). For a good overview of the provisions of the Hatch-Waxman Act, see generally Thomas F. Cotter, *Refining the "Presumptive Illegality" Approach to Settlements of Patent Disputes Involving Reverse Payments*, 87 MINN. L. REV. 1789 (2003).

⁷⁵ 21 U.S.C. § 355(j)(2)(A)(vii)(IV) (mandating that an application for a new drug based on an already approved but patented drug contain a certification "that such patent is invalid or will not be infringed by the manufacture, use, or sale of the new drug for which the application is submitted").

⁷⁶ 21 U.S.C. § 355(j)(5)(B)(iii) (stating that if a patent owner brings an action for infringement against a new drug manufacturer, approval of the new drug will be effective only after the expiration of a mandatory thirty-month period).

⁷⁷ See, e.g., *In re Biovail Corp.*, No. 011 0094, 2002 WL 727033 (F.T.C. April 23, 2002) (consent decree settling antitrust charges related to sequential listing of patents covering Tiazac in the Orange Book); 2 HERBERT HOVENKAMP ET AL., IP AND ANTITRUST § 33.9 (2003) (discussing cases involving this practice).

⁷⁸ See, e.g., Lara J. Glasgow, *Stretching the Limits of Intellectual Property Rights: Has the Pharmaceutical Industry Gone Too Far?*, 41 IDEA 227, 233-35 (2001) (pointing out the loopholes in the Hatch-Waxman Act that pharmaceutical companies exploit to extend the life of their patents); Christine S. Paine, *Brand-Name Drug Manufacturers Risk Antitrust*

blatant gaming of the Hatch-Waxman rules for pharmaceutical patents.

The existence of continuation applications facilitates evergreening. Evergreening without using continuations is possible, but it would be much more difficult, since the patentee would have to file multiple applications on the same day but manage to draw one prosecution out much longer than another without using continuations. Abolishing continuations would help end the practice. There may be other ways to solve the problem, however. Evergreening has been challenged as an antitrust violation, though courts generally have not been receptive to these claims.⁷⁹ Legislation enacted by Congress at the end of 2003 closed the Hatch-Waxman loophole by requiring that patentees obtain no more than one thirty-month stay per product, no matter how many patents they list in the Orange Book.⁸⁰ Such statutory or antitrust solutions would be largely unnecessary, however, if continuations were abolished.

B. *Attempts to Combat the Problems Created By Continuations*

The abuse of continuation practice has led to a number of legislative and judicial efforts to solve the problems by indirect means. Congress has changed the patent term, required that patent applications be published before they issue, and is considering changing the Hatch-Waxman rules for pharmaceutical patent litigation. The Federal Circuit has created an entirely new doctrine (prosecution history laches) and revived another (the written description doctrine). The PTO is considering a proposal to change the way it charges fees in order to discourage the filing of multiple continuation applications. All this was done in order to combat some of the evils of continuation applications. This section briefly reviews those legal changes. We note that they have not been completely effective in preventing abuse of continuation practice, and that the new doctrines in turn create problems of their own. It is also important to note that approximately 1.3 million issued patents in the dataset were filed before the term change and could still be in force today with a term of seventeen years from issuance.⁸¹ Suffice it to say that despite the legal

Violations By Slowing Generic Production Through Patent Layering, 33 SETON HALL L. REV. 479, 497 (2002) (defining the tactic of evergreening as a strategy to extend monopoly); Frederick Tong, *Widening the Bottleneck of Pharmaceutical Patent Exclusivity*, 24 WHITTIER L. REV. 775, 787-88 (2003) (discussing the legitimate and problematic purposes of evergreening).

⁷⁹ See Paine, *supra* note 78, at 507 (arguing that evergreening involves petitioning the government for patent rights, and so is likely to be protected from antitrust scrutiny by *Noerr-Pennington* immunity).

⁸⁰ Greater Access to Affordable Pharmaceuticals Act of 2001, S. 812, 107th Cong. (2002) (proposing to amend the Food, Drug, and Cosmetic Act to provide better access to generic drugs). The bill was signed into law as part of the Medicare bill on December 8, 2003. See The Medicare Prescription Drug, Improvement, and Modernization Act of 2003, Pub. L. No. 108-173 (to be codified as amended in scattered sections of 42 U.S.C.).

⁸¹ Since patents may expire because their owners fail to pay their maintenance fees, and

changes we describe here, there remains both a large pool of potential submarine patents still in force and a continued potential for abuse of the continuation process in new applications.

1. Changing the Patent Term

The adoption of the twenty-year patent term for applications filed beginning in 1995⁸² reduces the incentives to extend prosecution through continuation practice. Under pre-1995 law, a patent was given seventeen years of protection regardless of how long it took to obtain. Because the new patent term is measured twenty years from the date the first application is filed, applicants who spend significant time in prosecution lose an equivalent amount of time from the patent term.⁸³ This reduces the incentive to engage in long-duration continuation practice, and eliminates entirely the incentive to continue an application for more than twenty years.

While the patent term change undoubtedly reduces the incentive to submarine patent, continuation practice has continued to be problematic. A recent study by Graham and Mowery finds that the use of continuations rose from approximately 12% of all applications in the late 1980s to 30% of all applications by the mid-1990s. By the late 1990s, after the patent term changed, the number of continuations had fallen somewhat to 20%, but was still well above its historic levels.⁸⁴ Some of the problems that remain are

indeed approximately two-thirds of all patents eventually do so, *see* Lemley, *supra* note 7, at 1503 (finding that “nearly two-thirds of all issued patents lapse for failure to pay maintenance fees before the end of their term: nearly half of all patents are abandoned in this way before their term is half over”), there are no accurate calculations presently available for the number of enforceable patents at any given time. While we can calculate the number of patents filed before June 8, 1995 which have yet to expire due to term end, and can therefore get an idea of the maximum number of potentially enforceable patents (1,300,000), we cannot calculate the exact number that are still enforceable or the number of potential submarine patents in that group. One of the authors, however, is currently studying patents that expire due to failure to pay maintenance fees and what can be learned from them. Kimberly A. Moore, *Worthless Patents* (on file with author).

⁸² 35 U.S.C. § 154(a)(2) (2000) (“[A] grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed . . . or, if the application contains a specific reference to an earlier filed application or applications . . . from the date on which the earliest such application was filed.”).

⁸³ This statement is no longer entirely accurate. Congress changed the law in 1999 to give back some patent term where the PTO was responsible at least in part for the time spent in prosecution. 35 U.S.C. § 154(b) (describing situations and providing procedures for the adjustment of patent terms). Nonetheless, applicants get less protection the more time they spend in prosecution.

⁸⁴ Stuart J.H. Graham & David C. Mowery, *Submarines in Software? Continuations in U.S. Software Patenting in the 1980s and 1990s*, ECON. INNOVATION & NEW TECHS. (forthcoming 2004), available at http://faculty.haas.berkeley.edu/graham/jobmarket/graham_moweryEINT.pdf (last accessed Jan. 13, 2004) (providing a graph charting

transition issues. The twenty-year patent term applies only to applications filed after June 7, 1995,⁸⁵ and indeed there was a rush to file applications before that deadline.⁸⁶ As discussed earlier, there could be as many as 1.3 million issued, enforceable patents that exist under the old patent term.⁸⁷ Those patents will slowly dwindle over time.

Even beyond the transition period, submarine patenting can be expected to continue. While an applicant faced with the twenty-year term would not have any incentive to delay her prosecution twenty years or more, since she would lose the entire period of exclusivity, a patentee may well have an incentive to sacrifice, say, ten years of patent term in order to capture an industry by surprise. This is particularly true in industries such as pharmaceuticals or biotechnology, where the main economic value of a patent comes late in the patent, after FDA approval.⁸⁸ The PTO has several means of categorizing an invention according to its technological field. Broadly, all inventions are classified into "technology centers" (of which there are 7); more narrowly, inventions are classified into a "technology class" (of which there are 464). Within technology classes there are further levels of subclassification.⁸⁹ Table 2 demonstrates that the frequency of continuation practice varies by technology center, with the highest percentage of continuations filed in the Biotechnology and Chemical areas. Table 2 also shows the corresponding delay in prosecution caused by these continuations.⁹⁰

continuation patents as a share of issued patents from 1987 through 1999).

⁸⁵ Uruguay Round Agreements Act, Pub. L. No. 103-465, § 532, 108 Stat. 4809, 4984 (1994) (amending 35 U.S.C. § 154 to provide a patent term of twenty years). Applications filed or patents in force before June 7, 1995 are entitled to the longer of the two term options. Any continuations or divisionals filed after June 7, 1995 have the term twenty years from earliest claimed filing date. See MANUAL, *supra* note 11, § 2701 (explaining the application of the amended patent term).

⁸⁶ See Allison & Lemley, *supra* note 20, at 2119 & n.66 (documenting this effect); Quillen et al., *supra* note 22, at 39-42 figs.1-4 (documenting the spike in filings in 1995).

⁸⁷ See *supra* note 81 (estimating that there are 1.3 million patents in force that were filed before June 8, 1995).

⁸⁸ See, e.g., Allison et al., *supra* note 23. As a result, it is not surprising that patentees in those industries are particularly likely to use continuation applications.

⁸⁹ We recognize that the PTO's classification system for delineating inventions by technology is far from perfect. For example, there is no single technology class or center that contains all software; rather, software inventions may be found in many different classes. For criticisms of the PTO's technology classifications system, see Allison et al., *supra* note 23 (explaining that the PTO classification system was "never intended to provide conceptual delineations of technology areas, but instead identify inventions by function at very low levels of abstraction in order to serve as aids to prior art searching"). In an ideal world, we would classify each patent by hand into the proper area of technology. With a database of over two-million patents that is, of course, unrealistic. The reader should be aware that the broad technology classes we discuss here do not map perfectly the actual industry boundaries.

⁹⁰ While length of prosecution is affected by continuation practice, factors such as

Table 2: Continuation Filing By Technology Center

Tech Center #	Tech Center	% of Applications that are Continuations	Length of Prosecution (Yrs)
1600	Biotechnology and Organic Chemistry	43%	3.34
1700	Chemical and Materials Engineering	30%	2.54
2100	Computer Architecture, Software, and Information Security	25%	3.17
2600	Communications	21%	2.75
2800	Semiconductors, Electrical and Optical Systems and Components	18%	2.28
3600	Transportation, Construction, Electronic Commerce, Agriculture, National Security	15%	2.20
3700/2900	Mechanical Engineering, Manufacturing, and Products and Designs	20%	2.21

Another reason why the twenty-year term will not eliminate abuse of continuations is that a patent applicant who obtains a patent in order to hold-up a mature industry may not be as concerned about the length of the exclusion right as they are about taking the industry by surprise. For such a patentee, it may be worth foregoing some years of royalties if they can coerce licensing payments from companies who have already made asset-specific investments in the technology that is ultimately patented.⁹¹ In addition, the ability of a

technology class, number of claims, and the number of prior art references also affect it. See *infra* notes 210-212 and accompanying text (discussing the factors that impact length of prosecution).

⁹¹ For a discussion of co-specific assets that correlate with inventions and that companies can appropriate, see David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RES. POL'Y 285, 288-90 (1986) (explaining that the owners of complementary assets, rather than owners of intellectual property, often receive the profits of innovation). For a more specific example of how such asset-specific investments can facilitate hold-up by patent lawyers, see Patterson, *supra* note 62 (noting that patent owners can demand a higher royalty rate once their inventions have been incorporated in industry standards).

patentee to obtain an early patent in a quick prosecution and also to keep a continuation application pending means that the patentee need not forego all protection while the continuation application is pending, but could enforce the narrow patent while waiting to issue a broad one.⁹²

While the twenty-year term measured from filing date does help minimize submarine patenting or at least limits the amount of time these patents can stay under, it does not eliminate the harmful impact of the surprise on the maturing industry of an intentionally delayed patent. Moreover, if the twenty-year term were absolute, it would disadvantage some innocent applicants whose prosecutions are delayed for legitimate grounds or through no fault of their own. Responding to this concern, Congress created exceptions to the twenty-year term that permit patent term choice,⁹³ restorations of lost term,⁹⁴ adjustments in the calculation of patent term,⁹⁵ and extensions of patent term.⁹⁶

⁹² Patent law does forbid so called double-patenting, at least where the two patents claim the identical invention. *Gen. Foods Corp. v. Studiengesellschaft Kohle mbH*, 972 F.2d 1272, 1280-81 (Fed. Cir. 1992) (“[T]he same invention cannot be patented more than once;” otherwise “a second patent . . . would expire some time after the original patent and extend the protection time-wise.”).

Patent law also restricts the patenting of obvious variants on an existing invention under the judicially created doctrine of “obviousness-type double patenting.” *In re Goodman*, 11 F.3d 1046, 1052-53 (Fed. Cir. 1993) (discussing the doctrine of obviousness-type double patenting). Interestingly, the obviousness-type double patenting rules developed in ways that punished applicants who intentionally delayed prosecution, but not those whose prosecution was delayed because of PTO mistakes. *Compare In re Emert*, 124 F.3d 1458, 1461-62 (Fed. Cir. 1997) (holding that, where the defendant “orchestrated the rate of prosecution for the two applications,” the claims of his second patent were unpatentable under the obviousness-type double patenting doctrine), *with In re Braat*, 937 F.2d 589, 594 (Fed. Cir. 1991) (stating that the court must apply a different standard where it was not the defendant’s fault that one patent issued before the other). Because obviousness-type double patenting can be cured by disclaiming the period of protection after the expiration of the first patent, *see Ortho Pharm. Corp. v. Smith*, 959 F.2d 936, 940 (Fed. Cir. 1992) (“Unlike ‘same-invention’ double patenting, obviousness-type double patenting can be overcome by filing a terminal disclaimer.”), it no longer has much relevance since the patent term was changed to run twenty years from the filing of the first application.

⁹³ Any patent filed before June 7, 1995 and still pending gets the longer of the two patent terms. *See supra* note 82-87 and accompanying text (discussing the effect of statutory changes to the patent term).

⁹⁴ 35 U.S.C. § 155A (2000) (providing for patent term restoration where the FDA stayed approval of the patented product inhibiting the patentee’s utilization of their exclusive patent term).

⁹⁵ 35 U.S.C. § 154(b) (2000) (providing for adjustment in patent term where delays are attributable to the PTO). There are even appeal procedures for disputes regarding the appropriate amount of patent term adjustment. *Id.* § 154(b)(4) (providing that an applicant dissatisfied with a term adjustment made under the statute can file a civil action in the U.S. District Court for the District of Columbia).

⁹⁶ 35 U.S.C. § 155 (providing for patent term extensions where the FDA stayed approval

As a result, one cannot tell when a patent expires without complicated patent term calculation and resort to the patent's prosecution history. These deviations from the twenty-year term may further reduce its effectiveness in dealing with abuse of the continuation process.

2. Publishing Patent Applications

A second legislative attempt to control submarine patenting is the new requirement that patent applications be published eighteen months after they are filed.⁹⁷ Publishing pending applications in theory reduces uncertainty, since it gives competitors an opportunity to find out who has pending patent applications. In practice, however, the anemic publication rules in U.S. patent law are unlikely to have much effect. Congress significantly weakened the eighteen-month publication rule before passing it in 1999. The statute requires publication only of those applications that will also be filed abroad.⁹⁸ Because the rest of the world already required publication eighteen months after filing,⁹⁹ the U.S. publication requirement will result in little or no increase in the information that is published. Applications that were already published abroad will now be published in the United States as well, but applications that were not filed or published abroad need not be published in the United States either.¹⁰⁰ Because many submarine patentees are individuals who do not file

of the patented product inhibiting the patentee's utilization of their exclusive patent term); 35 U.S.C. § 156 (2000) (providing for patent term extensions when a product covered by the patent claims has been subject to regulatory review).

⁹⁷ 35 U.S.C. § 122(b) (2000) (mandating that patent applications be published unless one of the stated exceptions apply).

⁹⁸ 35 U.S.C. § 122(b)(2)(B)(i) ("If an applicant makes a request upon filing, certifying that the invention disclosed in the application has not and will not be the subject of an application filed in another country . . . the application shall not be published."). Indeed, the statute provides that a patentee does not have to publish any material that she is not already obligated to publish abroad. *Id.* § 122(b)(2)(B)(v) (providing that, if a foreign filed application "is less extensive than the application or description of the invention in the application filed in the Patent and Trademark Office," the applicant can submit a redacted application, and the PTO may only publish that copy). Thus, it essentially adds nothing to what was already being published outside the United States. Moreover, design patents, provisional applications, and applications no longer pending (abandoned or not issued) are not published. *Id.* § 122(b)(2)(A)(i)-(iv) (listing exceptions to the publication rule).

⁹⁹ See, e.g., Charles R. McManis, *Intellectual Property, Genetic Resources and Traditional Knowledge Protection: Thinking Globally, Acting Locally*, 11 CARDOZO J. INT'L & COMP. L. 547, 565 n.85 (2003) (discussing "the requirement in most national patent systems that patent applications be published eighteen months after they have been filed").

¹⁰⁰ Early evidence from the PTO suggests that most applications are being published, presumably including some that are not also filed abroad. But the abusers of continuation practice—those who engage in submarining or changing claims—will have an incentive to avoid publication.

abroad,¹⁰¹ they will not be deterred by the eighteen-month publication rule. Further, our data show that individual domestic inventors, who are least likely to patent abroad, are the most common users of the continuation system. There are 854 patents that took twenty years or longer in prosecution,¹⁰² and 26% of these patents issued to U.S. individuals.¹⁰³

Even for those applications that are published, the fact that the patent has not issued means that competitors still face significant uncertainty. A competitor can find out that an application is pending, but cannot know for sure whether a patent will issue¹⁰⁴ and, until the patent issues, what the scope of its claims might be.¹⁰⁵ Moreover, even if publication of the original application occurs, it currently requires significant effort to get access to the ongoing prosecution record.¹⁰⁶ Hence, publication will not solve the problem of changing claims to track competitors. If the patentee changes claims over time, those changes may take the market by surprise even if competitors read the published applications.¹⁰⁷ Publication is also limited in scope: there is no publication of

¹⁰¹ For example, none of the fifty patents with the longest delays claim priority to any foreign filings. Foreign filings may have been made after the U.S. patent filing, however, a possibility that our dataset does not allow us to determine.

¹⁰² See Table 1, *infra* Appendix A.

¹⁰³ By contrast, U.S. individuals obtain only 18% of all issued patents.

¹⁰⁴ To be sure, it is a pretty good bet that the patent will ultimately issue. Quillen et al. demonstrate that the PTO issues patents on about 85% of the application chains it receives, far more than the European or Japanese patent offices. Quillen et al., *supra* note 22, at 38 (determining that the PTO issues patents on over 85% of application chains filed when continuations are taken into account).

¹⁰⁵ Patent claims are often amended during prosecution, see ROBERT P. MERGES, PATENT LAW AND POLICY 51 (3d ed. 2002) (noting that applicants often amend specifications and claims during patent prosecution), and one of the reasons to file a continuation application is to get a chance to argue for claims different from those in the original application. See *supra* notes 45-59 and accompanying text (discussing the use of continuation applications to allow for opportunities to amend claims).

¹⁰⁶ The PTO has “laid open” the patent prosecution at its offices in Virginia, but does not publish the prosecution history of pending applications or make the information available electronically. The only way to obtain such information is to show up at the PTO and request it. Beginning in 2004, however, the PTO’s “PAIR” system promises to make electronic file wrappers for published applications open to the public. This system, when implemented, will be a significant advance in accessibility of patent applications.

¹⁰⁷ Many of the patents with the longest delays did have a relative in the chain of priority issue at some point during prosecution. While this would give the public access to the specification of the patent that issued including the written description and the claims, the public has no way of knowing that the applicant would later seek broader claims. The issuance of a patent in the chain with narrow claims, like the publication of an application with narrow claims, can actually mislead the public. Accordingly, we believe that intervening rights ought to arise in these circumstances. See *infra* notes 191-201 and accompanying text (proposing that intervening rights be used when a competitor adopts her technology prior to the issuance of the continuation patent).

provisional applications,¹⁰⁸ design patents,¹⁰⁹ applications subject to secrecy, or applications that are no longer pending.¹¹⁰

Further, while publication provides competitors with an opportunity to see what applications are pending, it does not necessarily follow that competitors will take advantage of that opportunity. There are strong incentives for competitors *not* to read patents or published patent applications. Reading a patent puts a company on notice of possible infringement, triggering an obligation to pay for an expensive written opinion of counsel or risk treble damage liability and attorneys' fees as a willful infringer.¹¹¹ Companies often advise their employees not to read patents;¹¹² even if this is good advice, it plays into the hands of submarine patentees.

3. Increased Use of the Written Description Requirement

In recent years, the Federal Circuit has attempted to curtail abusive continuation practice by strengthening the written description requirement.¹¹³ Section 112 requires that a patent contain a written description of the invention the applicant seeks to claim.¹¹⁴ For continuation applications, the originally

¹⁰⁸ See 35 U.S.C. § 111(b) (2000) (defining provisional applications).

¹⁰⁹ See 35 U.S.C. § 171 (defining design patents).

¹¹⁰ 35 U.S.C. § 122(b)(2)(A) (listing the exceptions to the publication rule).

¹¹¹ For more on this remarkable doctrine, see Mark A. Lemley & Ragesh K. Tangri, *Ending Patent Law's Willfulness Game*, 18 BERKELEY TECH. L.J. (forthcoming Fall 2003); Matthew D. Powers & Steven C. Carlson, *The Evolution and Impact of the Doctrine of Willful Patent Infringement*, 51 SYRACUSE L. REV. 53, 71 (2001) (tracing the emergence of an affirmative duty rule in patent infringement). The Federal Circuit recently granted en banc review to consider the willfulness doctrine. See *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 344 F.3d 1336 (Fed. Cir. 2003).

¹¹² Companies often advise their scientists not to read patents at all for fear of being determined to be willful infringers. See, e.g., Lemley & Tangri, *supra* note 111. Applicants may have an incentive to put competitors on notice of published patent applications as soon as possible to take advantage of a right to collect pre-issuance royalties from those who copied the published applications. See 35 U.S.C. § 154(d)(1) (including in a patent the right to collect a reasonable royalty from anyone who makes or sells the invention in the published patent).

¹¹³ See, e.g., Brian Wm. Higgins, Note, *Reiffin and the New Economy: Rethinking the Use of the Written Description Requirement to Curb Submarine Patent Tactics*, 11 FED. CIR. B.J. 23, 24-25 (2001-2002) (arguing that, although the written description requirement has become "the latest weapon against these so-called submarine patent tactics," "the test is fraught with imperfection, and adds confusion rather than clarity to the submarine patent problem").

¹¹⁴ 35 U.S.C. § 112. Section 112 states:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same

Id.

filed specification must meet the § 112 written description requirement for the newly filed claims. The purpose of this requirement is to ensure that the applicant claiming priority to an earlier-filed application possessed the invention and made this possession clear in her original specification. In circumstances where the original application does not disclose the invention sought to be claimed in the continuation application, those continuation claims are invalid for failing to satisfy the written description requirement.¹¹⁵

In the main, the written description requirement exists to combat continuation abuse. The focus of the doctrine on claims changed during prosecution is consistent with a desire to eliminate one of the core harms of continuation practice, the drafting of new claims designed to capture inventions first made by competitors. The Federal Circuit has also expanded the written description requirement beyond continuation cases by holding that even originally filed claims can fail the written description requirement, at least in the biotechnology field.¹¹⁶ The strengthening and evolution of the

¹¹⁵ See, e.g., *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330-31 (Fed. Cir. 2003) (summarizing the written description requirement with respect to future claims); *Cooper Cameron Corp. v. Kvaerner Oilfield Prods., Inc.*, 291 F.3d 1317, 1322 (Fed. Cir. 2002) (finding that the written description requirement was satisfied where the original application included a drawing of the invention claimed); *Hyatt v. Boone*, 146 F.3d 1348, 1352 (Fed. Cir. 1998) (explaining that, when seeking to rely on an earlier filing date, the earlier application must satisfy the written description requirement); *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479-80 (Fed. Cir. 1998) (holding that the claims added during prosecution to read on competitor's device were invalid for failing to satisfy the written description requirement).

¹¹⁶ See, e.g., *Enzo Biochem, Inc. v. Gen-Probe, Inc.*, 323 F.3d 956, 968 (Fed. Cir. 2002) (holding that the written description requirement can even invalidate originally filed biotechnology claims); *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1568 (Fed. Cir. 1997) (holding that originally filed biotechnology claims were invalid for failing to satisfy the written description requirement); Janice M. Mueller, *The Evolving Application of the Written Description Requirement to Biotechnological Inventions*, 13 BERKELEY TECH. L.J. 615, 652 (1998) (commenting that "the *Lilly* decision . . . reflect[s] an increasingly-widening gulf between the norms of the business and scientific community and those of the United States patent system"); Harold C. Wegner, *When a Written Description is Not a "Written Description": When Enzo Says It's Not*, 12 FED. CIR. B.J. 271, 273-74 (2002) (highlighting the Federal Circuit's rejection of the argument that original claims meet the written description requirement). For criticism of the court's extension of written description to DNA cases, see Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1155, 1173-85 (2002) (describing and critiquing the application of the rules of patent law to biotechnology patent cases); Arti K. Rai, *Intellectual Property Rights in Biotechnology: Addressing New Technology*, 34 WAKE FOREST L. REV. 827, 834-35 (1999) (claiming that the court's use of the written description requirement "raises the patentability bar," and arguing that the court's characterization of DNA-based technology is "fundamentally misconceived"); Margaret Sampson, *The Evolution of the Enablement and Written Description Requirements Under 35 U.S.C. § 112 in the Area of Biotechnology*, 15 BERKELEY TECH. L.J. 1233, 1258-62 (2000) (highlighting several

written description requirement has been criticized as incoherent.¹¹⁷ It seems to narrow the scope of patent claims and provides a powerful new weapon to those seeking to invalidate patents, particularly patents issued before the mid-1990s, when the doctrine was rejuvenated. At the same time, the court has cut back on the broad reading of the written description requirement as applied to claim changes, the very area in which the doctrine is most useful.¹¹⁸

Even if the written description requirement were a predictable and coherent doctrine, it would do nothing to solve several of the continuation-based abuses such as wearing down the examiner, surprising the industry, or extending one's monopoly. The only continuation-based abuse that could be addressed by a strong written description requirement is the filing of broader claims in a continuation to read on a competitor's device that the earlier specification did not clearly disclose. Written description is therefore, at best, only a partial solution to the problem of continuation abuse.

4. New Prosecution Laches Defense

The Federal Circuit created a new defense to patent infringement (or more precisely revived a dormant one)¹¹⁹ in 2002. Called "prosecution laches," the

arguments against the Federal Circuit's extension of the written description requirement). For an argument that this expansion of the written description requirement is limited to biotechnology cases, see Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1653-54 (2003) ("The Federal Circuit has applied the doctrine to biotechnology cases in a way that would be inconceivable in other industries . . .").

¹¹⁷ For criticism of the written description doctrine as applied to changed claims, see *Moba, B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1327-28 (Fed. Cir. 2003) (Bryson, J., concurring) (suggesting that written description is unnecessary as a way of dealing with claim changes); Jeffie A. Kopczynski, *A New Era for § 112? Exploring Recent Developments in the Written Description Requirement as Applied to Biotechnology Inventions*, 16 HARV. J.L. & TECH. 229, 230 (2002) (asserting that the new written description requirement is "unduly rigid"); Harris A. Pitlick, *The Mutation on the Description Requirement Gene*, 80 J. PAT. & TRADEMARK OFF. SOC'Y 209, 222 (1998) (calling the doctrine "an unmitigated disaster"); Laurence H. Pretty, *The Recline and Fall of Mechanical Genus Claim Scope Under "Written Description" in the Sofa Case*, 80 J. PAT. & TRADEMARK OFF. SOC'Y 469, 479 (1998) (addressing the use of an originally filed claim as a written description that limits later claims). The written description requirement might still play a role in cases in which, without filing a continuation, a patentee changed her claims to cover a competitor's technology during the initial prosecution period. Because the time elapsed is shorter, however, that is less likely to happen than claim changes that occur during prosecution of a continuation application.

¹¹⁸ See, e.g., *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985 (Fed. Cir. 1999).

¹¹⁹ The Federal Circuit only recently endorsed the defense as a valid ground for challenging the enforceability of a patent. We call it a revived defense, however, because the Federal Circuit held that prosecution laches is a viable defense based on Supreme Court precedent nearly eighty years in age. *Symbol Techs., Inc. v. Lemelson Med. Ed. & Res. Found.*, 277 F.3d 1361, 1364-65 (Fed. Cir. 2002) (validating the defense). Of course, the

defense renders unenforceable patents that spent an unreasonable amount of time in prosecution without sufficient explanation,¹²⁰ and permits the PTO to reject applications that have been unreasonably delayed by the applicant.¹²¹ The new prosecution laches defense may help function as a catchall to ultimately render unenforceable those submarine patents that either were not eliminated through other reform efforts or were filed before the reforms went into effect. Prosecution laches is hardly an optimal solution, however. Litigation is expensive, time consuming, and uncertain.¹²² At present, only one district court has held that the prosecution laches defense ought to apply, and in that case, the delays in prosecution were as long as thirty-nine years.¹²³ The hesitancy of the district courts to utilize this defense may be attributable to the difficulty in assessing the reasonableness of the delay, a problem that our empirical study can help eliminate. We discuss our data on the reasonableness of continuation delays in the next Part.

III. ELIMINATING CONTINUATION APPLICATIONS

The doctrines we described in the last Part are helpful in combating some of the worst abuses. They do not, however, solve the problem of continuation abuse altogether, and they come with their own costs. Moreover, they are efforts to address the problem indirectly. Instead, we consider solving the

Federal Circuit had itself indicated that there was no such defense in several non-precedential decisions. *See* *Ricoh Co. v. Nashua Corp.*, No. 97-1344, 1999 WL 88969, at *3 (Fed. Cir. Feb. 18, 1999) (rejecting suggestion that continuation applications are subject to any judicially-imposed time restrictions); *Ford Motor Co. v. Lemelson*, No. MISC. 516, 1997 WL 547905, at *1 (Fed. Cir. Aug. 20, 1997) (refusing to grant Ford permission to appeal the district court's denial of summary judgment, which was based on the laches defense); *Bott v. Four Star Corp.*, No. 88-1117, 1988 WL 54107, at *1 (Fed. Cir. May, 26 1988) (refusing to recognize the defense). Unpublished, non-precedential decisions of the court are not binding authority on the Federal Circuit and, in fact, are not even to be cited to the court in briefs or during oral arguments. *See* FED. CIR. R. 47.6(b).

¹²⁰ *Symbol Techs., Inc.*, 277 F.3d at 1361 (discussing the effect of the prosecution laches defense).

¹²¹ *In re Bogese*, 303 F.3d 1362, 1367 (Fed. Cir. 2002) (granting the PTO the authority to reject patent applications under its holding in *Symbol Technologies*).

¹²² *See* AM. INTEL. PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY 2003, at 21-22 (2003) (demonstrating that the median litigation expenses for a patent infringement case are two-million dollars per side).

¹²³ *Symbol Techs. Inc. v. Lemelson Med. Ed. & Research Found.*, No. CV-S-01-703-PMP(RJJ), 2004 WL 161331 (D. Nev. Jan. 23, 2004) (holding Lemelson's patents unenforceable for prosecution laches on the basis of delay from eighteen to thirty-nine years). All of the other district courts that have ruled on the issue have found no laches because the time involved was not unreasonable. *See infra* note 204 (listing these district court opinions). *Cf.* *Digital Control, Inc. v. McLaughlin Mfg. Co.*, 225 F. Supp. 2d 1224, 1242 (W.D. Wash. 2002) (holding that factual issues precluded resolution of prosecution laches on summary judgment).

problem directly by eliminating continuation applications altogether.

Eliminating continuation applications is the obvious solution to the manifold abuses of the system. But is it the right solution? In this Part, we consider the likely effects of abolition. We begin by examining the justifications that have been offered by patentees and scholars in support of continuation applications, and find those arguments generally wanting. While there is some risk that abolishing continuation applications will weaken the value of patents, the weakening that is most likely to occur is in the anticompetitive “hold-up” value of a small subset of patents. Weakening the power of patentees to hold-up true innovators is a feature of abolition, not a bug. Next, we consider some complications that arise from the various forms of continuation practice. Any proposal to eliminate continuations and continuation-in-part applications should not extend to divisional applications. Eliminating continuations altogether would not eliminate all abuses of the patent prosecution system, but it would certainly restrict those abuses and eliminate the worst elements.

While abolishing continuation practice would address many of our concerns about abuse of the patent system, our empirical research convinces us that such a solution may be overkill. There are only a few inventors who are severely abusing continuation practice. Those abuses are spotlighted because the inventors who abuse the system are more likely to litigate their patents. The abuse, while severe, is narrow in scope. As Table 1 demonstrates, only a few patents issued with particularly lengthy prosecutions based upon numerous continuations. Moreover, we recognize the political realities that would likely prevent Congress from abolishing continuation practice. Accordingly, since continuations will likely remain a part of the patent landscape, we propose several interim measures that can be employed to help solve the problems they present.

A. *Justifications for Continuation Applications*

Why do patentees file continuation applications? By and large, the benefits to patent applicants of filing continuations track the social harms discussed in the last section. Three such justifications can be disposed of easily. Patent applicants have historically used continuations to extend the effective life of their patents, to avoid having to disclose their technology too early, and to change claims in order to cover their competitors’ products.¹²⁴ It is easy to see why patentees would want to do these things; they are likely to enhance the value of the patent. They are also all things that society has a strong interest in preventing, however. Patent law reflects a series of bargains and compromises between the patentee, subsequent inventors, and the public. Patents must disclose the claimed invention in sufficient detail that others can make and use it; patents that do not provide such disclosure are invalid.¹²⁵ The disclosure

¹²⁴ See *supra* notes 45-80 and accompanying text (discussing these uses in detail).

¹²⁵ 35 U.S.C. § 112 (2000) (requiring that the “specification shall contain a written description of the invention, and of the manner and process of making and using it”).

requirement is imposed in order to give the public the ability to make and use the invention once the patent expires, and to design around the patent while in force.¹²⁶ Similarly, the patent term is limited so that the public may make use of the invention after a certain time without paying a royalty;¹²⁷ efforts to

¹²⁶ On the value of disclosure to the public as part of the patent bargain, see R. Polk Wagner, *Information Wants to be Free: Intellectual Property and the Mythologies of Control*, 103 COLUM. L. REV. 995, 1007 n.46 (2003) (arguing that inventions or works of expression can stimulate discussion, thus conveying an additional benefit); see also David J. Teece & Edward F. Sherry, *Standards Setting and Antitrust*, 87 MINN. L. REV. 1913, 1964 (2003) (discussing arguments for and against public disclosure of patent applications). The classical explanation is that disclosure of an invention permits the public to use it once the patent expires. See, e.g., *Eldred v. Ashcroft*, 123 S. Ct. 769, 791 (2003) (Stevens, J., dissenting) (“Complete disclosure as a precondition to the issuance of a patent is part of the *quid pro quo* that justifies the limited monopoly for the inventor as consideration for full and immediate access by the public when the limited time expires.”).

Disclosure serves another purpose as well—it permits competitors to design around the invention, creating a non-infringing product even while the patent is in force. On the social value of design-arounds, see *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 36 (1997) (contrasting “the intentional copyist making minor changes to lower the risk of legal action” with “the incremental innovator designing around the claims, yet seeking to capture as much as is permissible of the patented advance”); see also *Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 932 F.2d 1453, 1457 (Fed. Cir. 1991) (Rich, J.) (“Designing around patents is, in fact, one of the ways in which the patent system works to the advantage of the public in promoting progress in the useful arts, its constitutional purpose.”); *State Indus., Inc. v. A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985) (“One of the benefits of a patent system is its so-called ‘negative incentive’ to ‘design around’ a competitor’s products, even when they are patented, thus bringing a steady flow of innovations to the marketplace.”); Matthew J. Conigliaro et al., *Foreseeability in Patent Law*, 16 BERKELEY TECH. L.J. 1045, 1050 (2001) (“Unlike copyists, who merely mimic a device and add nothing to the public body of knowledge, those who invent new devices by intentionally designing around a patent nonetheless advance the public welfare and fulfill the purpose of the Patent Clause.”); Nard, *supra* note 5, at 40-41 (“The practice of designing-around extant patents creates viable substitutes and advances, resulting in competition among patented technologies. The public clearly benefits from such activity.”).

¹²⁷ A number of economists have attempted to derive the optimal patent term by balancing the incentives created by patent protection against the social value of permitting the public to practice the invention after expiration. See, e.g., WILLIAM D. NORDHAUS, *INVENTION, GROWTH, AND WELFARE* 76-86 (1969) (attempting to determine the optimal life of a patent); Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813, 1817 (1984) (attempting to derive an optimal patent term requires balancing the interests served by patent law and antitrust law); F.M. Scherer, *Nordhaus’ Theory of Optimal Patent Life: A Geometric Reinterpretation*, 62 AM. ECON. REV. 422, 424 (1972) (discussing the method for finding the socially optimal patent life); John F. Duffy, *A Minimum Optimal Patent Term* (working paper 2003), available at <http://ssrn.com/abstract=354282> (last accessed Jan. 31, 2004) (discussing the effect of changing Nordhaus’s assumption of a static model to that of a dynamic model). Cf. Ian Ayres & Paul Klemperer, *Limiting Patentees’ Market Power Without Reducing Innovation Incentives: The Perverse*

extend that time are illegal *per se*.¹²⁸ In addition, patent law divides entitlements between initial inventors and subsequent improvers, permitting the initial inventor to capture the value of an improver's technology only in limited circumstances.¹²⁹ These compromises are an integral part of the balance that patent law strikes between encouraging innovation and promoting the use and dissemination of new technology.¹³⁰ Continuation practice permits patentees to undo this balance, benefiting them privately but hurting society as a whole.

The patent statute strikes a balance between changing claims and stopping hold-ups through reissue practice, which permits patentees to broaden their claims within two years after the patent issues.¹³¹ Reissue practice already leaves competitors with a zone of uncertainty, but at least with reissue, the zone has a definitive end—two years from issuance, a competitor can be certain the claims' scope will not be expanded. Continuation practice makes this zone of uncertainty boundless.

A fourth reason patentees use continuation practice is more ambiguous in effect. Patentees often file continuations not to try to game the system, but in order to continue fighting for claims they believe they are entitled to but which examiners refuse to grant. These patentees are trying in good faith to obtain coverage they believe they are entitled to under the patent system. Continuation practice gives them multiple opportunities to persuade the PTO to grant their claims and the ability to refine their claims to make sure they are effective. But it is not clear that granting unlimited opportunities is good for society as a whole. Patent examiners have strong incentives to allow contested

Benefits of Uncertainty and Non-Injunctive Remedies, 97 MICH. L. REV. 985, 986-87 (1999) (suggesting that society would benefit from longer patent terms coupled with limited amounts of infringement); Richard Gilbert & Carl Shapiro, *Optimal Patent Length and Breadth*, 21 RAND J. ECON. 106, 111 (1990) (suggesting that optimal patents might be extremely long but quite narrow).

¹²⁸ *Brulotte v. Thys*, 379 U.S. 29, 32 (1964) (concluding that a "patentee's use of a royalty agreement that projects beyond the expiration date of the patent is unlawful *per se*"). See generally HOVENKAMP ET AL., *supra* note 77, §§ 3.3(b)(3), 23.2.

¹²⁹ For a discussion of the division of profit between initial inventors and subsequent improvers, see Jerry R. Green & Suzanne Scotchmer, *On the Division of Profit in Sequential Innovation*, 26 RAND J. ECON. 20, 21 (1995) (suggesting that profit should be weighted toward initial inventors); Lemley, *supra* note 59, at 993-1000 (suggesting the importance of balance between initial inventors and improvers); Merges & Nelson, *supra* note 59, at 70-78 (suggesting the importance of limiting the scope of warrants so as not to stifle further invention); Scotchmer, *supra* note 59 (discussing tradeoff).

¹³⁰ See MERGES ET AL., *supra* note 9, at 15 ("[T]he economic incentive benefits of intellectual property rights must be balanced against the costs of limiting diffusion of knowledge.").

¹³¹ 35 U.S.C. § 251 (2000) (prescribing that applicants must apply for reissue within two years of the grant of the original patent).

patent claims rather than continuing to fight.¹³² Permitting a patent applicant to file an unlimited number of continuations has the effect of “wearing down” the examiner, inducing the PTO to issue patents because they are sick of fighting rather than because the application deserves a patent.¹³³ The risk of issuing bad patents is a reason not to permit patentees to argue indefinitely for broad claims.¹³⁴ And it is worth noting that even abolishing continuations would not leave these patentees without recourse. The patent application process includes a provision for appeal to the Board,¹³⁵ and from there to the U.S. Court of Appeals for the Federal Circuit¹³⁶ or the U.S. District Court for the District of Columbia.¹³⁷ This appeal process, not continuation practice, is the way the patent system was intended to handle fights over patentability.¹³⁸

Despite the existence of an appeal process, there is some risk that, without continuation practice, patent applicants will not obtain claims of sufficiently broad scope to effectively protect their invention. That, in turn, could reduce incentives to innovate.¹³⁹ But we think that this risk is balanced by several

¹³² See *supra* notes 38-39 and accompanying text (discussing these incentives).

¹³³ For a discussion of the problem of “wearing down” examiners, see Allison et al., *supra* note 23 (discussing the tactic of wearing down patent examiners).

¹³⁴ Mark Lemley has argued elsewhere that we need not be too concerned about bad patents issuing, since most such patents will never be litigated. Lemley, *supra* note 7, at 1497 (arguing that it would not be cost efficient for the PTO to thoroughly examine all patent applications since few are actually litigated and more thorough procedures would cost too much). But our data has shown that patents based on continuation applications are more likely than other sorts of patents to be litigated, meaning that the costs of permitting bad patents to issue based on continuation applications are significantly higher than average.

¹³⁵ 35 U.S.C. § 134 (2000) (providing for appeal to the Board).

¹³⁶ 35 U.S.C. § 141 (providing for appeal of the Board’s decision to the U.S. Court of Appeals for the Federal Circuit, provided that patentee has not exercised appeal to the U.S. District Court for the District of Columbia).

¹³⁷ 35 U.S.C. § 145 (providing for appeal of the Board’s decision to the U.S. District Court for the District of Columbia, provided that patentee has not exercised appeal to the U.S. Court of Appeals for the Federal Circuit).

¹³⁸ The appeal process is slow, however, particularly at the Board, and if the patent system is to rely more heavily on appeals, it would be a good idea to devote resources to expediting them.

¹³⁹ This is a problem only if patent protection is not too strong already. If patents are too strong now, weakening some of them might be good for society on balance. We express no opinion on this general question.

It is worth noting that the most valuable patents are more likely than average to use continuation applications. Continuations represent 23% of all issued patents and 52% of all litigated patents. To conclude from this that continuations make patents valuable, however, is probably to confuse cause and effect. Allison et al. find that patent applicants know in advance which patents are valuable and use tools like the continuation application to maximize the scope of those valuable patents. Allison et al., *supra* note 23 (suggesting that patent applicants know which patents are valuable, inducing them to justify the cost of additional prosecution). The technologies that underlie those patents would still be valuable

countervailing factors. First, the effective scope of patents has been limited in the last seven years by the rebirth of the written description requirement.¹⁴⁰ With the exception of biotechnology, all the written description cases have involved changes made to patent claims during prosecution, and indeed one judge has argued that that is the only proper role for the doctrine.¹⁴¹ Abolishing continuation applications would all but eliminate the need for this much-criticized doctrine.

Second, the doctrine of prosecution history estoppel significantly limits the scope of patents under the doctrine of equivalents. Prosecution history estoppel arises when a patentee amends its claims during prosecution to narrow them for a reason related to patentability.¹⁴² When this happens, with two narrow exceptions, the patentee gives up any argument under the doctrine of equivalents with respect to the amended claim element.¹⁴³ The courts have applied the doctrine of prosecution history estoppel broadly, finding virtually any limiting amendment to be made for a reason related to patentability¹⁴⁴ and

if the continuation right ceased to exist.

¹⁴⁰ See, e.g., *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330-34 (Fed. Cir. 2003) (holding that the district court was not clearly erroneous in determining that Amgen satisfied the written description requirement); *Cooper Cameron Corp. v. Kvaerner Oilfield Prods.*, 291 F.3d 1317, 1322-23 (Fed. Cir. 2002) (holding that the district court erred in granting summary judgment of invalidity on the basis of written description); *Hyatt v. Boone*, 146 F.3d 1348, 1355 (Fed. Cir. 1998) (holding that the Board did not clearly err in finding that appellant failed to satisfy the written description requirement); *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479 (Fed. Cir. 1998) (discussing the written description requirement and stating that a narrow disclosure limits the scope of the right to exclude).

¹⁴¹ See *Moba, B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1324-25 (Fed. Cir. 2003) (Rader, J., concurring) (arguing for a return to the original understanding of the description requirement as involving only changes in patent claims).

¹⁴² *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 33 (1997) (imposing upon the patent applicant the burden of establishing that the reason for amending her claim is not related to patentability, where the record reveals no reason for the amendment).

¹⁴³ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 740 (2002) (holding that the patentee has the burden of showing that an amendment does not surrender a particular equivalent). The two exceptions are where the effect of a claim change would not be foreseeable to a reasonable patent drafter, and where the intent of the claim change was tangential to the purpose for which it is now being asserted. The Court also suggested that an exception is possible where "there is some other reason the patentee could not reasonably be expected to have described the insubstantial substitute in question." *Id.* at 740-41.

¹⁴⁴ *Warner-Jenkinson Co.* created a presumption that any claim amendment that was not explained was necessary in order to issue the patent and therefore would create an estoppel. *Warner-Jenkinson Co.*, 520 U.S. at 33-34. *Festo Corp.* made clear that estoppel applies not just to amendments made to avoid the prior art, but also to amendments made for any reason at all related to the patentability of the invention. *Festo Corp.*, 535 U.S. at 736 ("Estoppel arises when an amendment is made to secure the patent and the amendment narrows the

refusing to accept post hoc arguments or boilerplate trying to explain away an amendment.¹⁴⁵ The more likely a patent claim is to be amended during prosecution, therefore, the less likely it is to be entitled to protection under the doctrine of equivalents. And the more times an applicant goes back and forth with an examiner, the more likely they are to amend their claims.¹⁴⁶ As a recent study by Doug Lichtman shows, there is good reason to believe that some examiners require claim amendments not because of any particular defect in the application at hand, but simply as a matter of course.¹⁴⁷ Abolishing continuations may therefore have the surprising effect of strengthening, not weakening, the scope of many patents by preserving the patentees' ability to argue for infringement under the doctrine of equivalents.

If continuations were abolished, the most serious problem patent prosecutors would face comes from the Federal Circuit's 2002 en banc decision in *Johnson & Johnston Associates, Inc. v. R.E. Service Co.*¹⁴⁸ In that case, the Federal Circuit held that a patentee who disclosed an embodiment in the patent but failed to claim that embodiment could not obtain protection for it under the doctrine of equivalents.¹⁴⁹ The court reasoned that the patentee was clearly aware of the invention, having described it in the patent specification, and should be required to claim the invention if she wanted it included within the

patent's scope.”).

¹⁴⁵ See, e.g., *Pioneer Magnetics, Inc. v. Micro Linear Corp.*, 330 F.3d 1352, 1357 (Fed. Cir. 2003) (holding that a patentee cannot escape the presumption by relying on arguments or testimony made after the fact); *Bai v. L&L Wings, Inc.*, 160 F.3d 1350, 1355 (Fed. Cir. 1998) (holding that a patentee cannot escape the presumption by including boilerplate language in the amendment stating that it was not made for a reason related to patentability).

¹⁴⁶ Amendments or arguments made during the prosecution of related applications bind all subsequent applications in the chain. See *Mycogen Plant Sci., Inc. v. Monsanto Co.*, 252 F.3d 1306, 1311 (Fed. Cir. 2001) (holding that statements made in a parent application must be construed the same way as statements made in continuations).

¹⁴⁷ Douglas G. Lichtman, *Rethinking Prosecution History Estoppel*, 71 U. CHI. L. REV. (forthcoming 2004), available at <http://www.law.uchicago.edu/Lawecon/index.html> (last accessed Jan. 14, 2004) (finding that some examiners routinely require language alterations and others do not); see also Iain Cockburn et al., *Are All Patent Examiners Equal? Examiners, Patent Characteristics, and Litigation Outcomes*, in PATENTS IN THE KNOWLEDGE-BASED ECONOMY 17, 19-20 (Wesley M. Cohen & Stephen A. Merrill eds., 2003) (finding significant variation in the quality and behavior of patent examiners).

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

¹⁴⁹ *Id.* at 1054-55 (“[W]hen a patent drafter discloses but declines to claim subject matter . . . this action dedicates that unclaimed subject matter to the public.” Therefore, “[h]aving disclosed without claiming the steel substrates, . . . [patentee] cannot now invoke the doctrine of equivalents to extend its aluminum limitation to encompass steel.”). This doctrine has been expanded even further in the recent case *PSC Computer Prods. v. Foxcomm Int'l, Inc.*, No. 03-1089, 2004 WL 78009 (Fed. Cir. Jan. 20, 2004) (barring equivalents where the accused infringing equivalent is part of unclaimed but only generally disclosed matter in the patent).

scope of the patent.¹⁵⁰ The court did, however, permit patentees to recapture such disclosed inventions by filing a reissue patent or a continuation application.¹⁵¹ Abolishing continuation applications would increase the importance of the patent drafter getting it right the first time (prior to issuance) or the second time (during the two year reissue period).¹⁵² Doing away with continuation practice would eliminate a mechanism that currently provides third (and fourth and fifth . . .) chances. Requiring patent applicants to claim what they disclose doesn't seem an unreasonable burden to impose. And it is certainly consistent with giving adequate notice to competitors about what is and is not covered by a patent, a policy goal the court has repeatedly emphasized.¹⁵³ It does, however, put a premium on getting claims drafted just right, and abolishing continuations means that patent prosecutors would have to get it right at the outset.¹⁵⁴

In short, there are not many good reasons for society to allow continuation applications. The most that can be said in their defense is that patent prosecutors will have a somewhat more difficult job if continuations are abolished. But that job will be far from impossible, and patent owners may even benefit from abolition in the long run, since the claims they obtain will be more likely to be held valid and they will have a greater chance to employ the

¹⁵⁰ *Johnson & Johnston Assoc., Inc.*, 285 F.3d at 1055.

¹⁵¹ *Id.* (citing 35 U.S.C. §§ 120, 251 (2000)). This is consistent with the suggestions of some commentators that a reissue proceeding, rather than broad application of the doctrine of equivalents, is the way to correct drafting errors in patent claims. See, e.g., Martin J. Adelman & Gary L. Francione, *The Doctrine of Equivalents in Patent Law: Questions that Pennwalt Did Not Answer*, 137 U. PA. L. REV. 673, 716 (1989).

¹⁵² The patent law permits an applicant who failed to claim part of her invention to seek a broader patent within two years by filing a reissue application. 35 U.S.C. § 251 (2000) (permitting reissued patents to enlarge the scope of the claims of the original patent within two years of grant of original patent). In addition, patentees can seek to *narrow* their claims through the reissue process at any time. *Id.*

¹⁵³ On the importance of notice to the public, see *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 33 (1997) (discussing the importance of public notice as a justification for establishing the prosecution history estoppel presumption where no reason for a claim amendment is explained in the prosecution history); *Johnson & Johnston Assoc., Inc.*, 285 F.3d at 1052 (stating that a function of the claim requirement is notice to the public); *Sage Prods., Inc. v. Devon Indus., Inc.*, 126 F.3d 1420, 1425, 1430 (Fed. Cir. 1997) (stating that the costs of foreclosed business activity are a more onerous burden on society than the costs of careful patent prosecution on patentees, and that the public-notice function of the claiming requirement should not be obviated by permitting a patentee to argue the doctrine of equivalents against a device lacking a functionality recited in a prior patent claim); Conigliaro et al., *supra* note 126, at 1056-57 (discussing the importance of the notice function).

¹⁵⁴ See also *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359, 1375 (Fed. Cir. 2003) (en banc) (Rader, J., concurring) (discussing the need for applicants to use continuation applications in response to the strict requirements of prosecution history estoppel).

doctrine of equivalents.

B. *Scope of the Abolition*

Continuation applications are not a unitary phenomenon. We have focused our attention so far on what were traditionally called “continuation applications,” which have been divided more recently into § 120 continuations, CPAs, and finally RCEs.¹⁵⁵ Two other types of continuation applications are also common in patent prosecution. First, an applicant can file a “continuation-in-part” (“CIP”) application if she wishes to add new information to an existing application.¹⁵⁶ CIP applications are entitled to claim priority back to the original application, but only for patent claims that arise out of the existing material, not claims based on the material added in the CIP.¹⁵⁷ Second, the PTO will sometimes impose what is called a “restriction” requirement on an applicant who has identified two or more distinct inventions in a single application. Applicants can file a “divisional” application in response to a restriction requirement, separating their original application into two or more applications, each with claims directed to a different invention.¹⁵⁸

If we abolish continuations, what should happen to CIPs and divisionals? Our answer is different for each. CIPs suffer from the same problems as continuations. They are under the control of the applicant, who can file an unlimited number. They are subject to abuse by applicants who seek to delay issuance or publication of a patent, to obtain multiple patents, or to change claims during prosecution. Indeed, the potential for abuse of a CIP is even greater than with ordinary continuations because CIPs allow the applicant to add new material to the application during the prosecution process while retaining an argument that any particular claim can be traced to the original material and therefore ought to be entitled to the original filing date. Applicants who wish to extend the duration of their patent can add “new matter”¹⁵⁹ to their application, taking a chance that the new material has not been disclosed elsewhere. If the material is in fact new, or if the PTO decides

¹⁵⁵ The PTO created the term “CPA” in 1997. Changes to Patent Practice and Procedure, 62 Fed. Reg. 53132 (Oct. 10, 1997) (to be codified at 37 C.F.R. pt. 1) (providing for continued prosecution applications). It abolished the term “CPA” in favor of “RCE” in 2003. See 37 C.F.R. § 1.53(d) (2003); see also Elimination of Continued Prosecution Application Practice as to Utility and Plant Patent Applications, 66 Fed. Reg. 35763 (July 9, 2001) (to be codified at 37 C.F.R. pt. 1) (giving notice of proposed rulemaking whereby the PTO proposed to eliminate CPA practice as to utility and plant applications).

¹⁵⁶ 37 C.F.R. § 1.153(b) (2003).

¹⁵⁷ MERGES ET AL., *supra* note 9, at 116.

¹⁵⁸ 35 U.S.C. § 121 (2000) (providing for the separation of applications where two or more independent and distinct inventions are claimed in the same application).

¹⁵⁹ 35 U.S.C. § 132(a) (declaring that “[n]o amendment shall introduce new matter into the disclosure of the invention”). This section prevents the addition of new matter during prosecution of an existing application; thus, it must be added in a CIP. *Id.*

the new matter is necessary to provide adequate disclosure for the claims, the applicant can decide to relinquish priority to the original application and start their twenty-year clock running from the date of the CIP. If, however, the new matter has in fact been disclosed in a prior art reference, they can argue that the original application adequately disclosed the invention, and then claim priority under that application.¹⁶⁰

Further, it is not clear that today's patent applicants have much legitimate need for CIPs. If the new matter disclosed in the CIP is patentably distinct from that in the original application, the applicant doesn't need to file a CIP at all: she can simply file a new patent application. If the "new" matter is in fact the same invention as disclosed in the original application, the CIP effectively acts as a regular continuation application of the type we have already discussed. The traditional justification for the CIP has come in the middle cases, where the original disclosure was not strong enough to justify the current claims, but close enough that it would invalidate those claims if considered as prior art. This most commonly occurs when the applicant claims an invention that was not disclosed in the original application, but would be obvious in view of that application. Congress changed the law in 1984 to permit most such applications to be patentable if filed separately, without the need for a CIP.¹⁶¹ After this statutory change, there is little reason why an applicant should need to file a CIP.

Divisional applications, by contrast, serve a useful purpose. They prevent

¹⁶⁰ While the shift to a twenty-year patent term foreclosed most opportunities for patentees to extend the length of their protection, CIP practice is a loophole. The *Manual of Patent Examining Procedure* does not require CIP applicants to decide immediately whether to claim priority to an original application. Rather, they can wait and see if they need priority, permitting them to engage in the game-playing described in text. MANUAL, *supra* note 11, § 201.08. Moreover, neither the application nor the issued patent ever specify which claims are entitled to which filing date, leaving competitors with no guidance as to the filing date or the corresponding expiration date of the patent claims.

¹⁶¹ The only reason the applicant could not file such a claim separately is if the original application constituted prior art to the new application. If the same inventor filed both applications, it would not constitute prior art except under 35 U.S.C. § 102(b), and then only if the original application was patented or published more than a year before the new application was even filed. This is both unlikely and avoidable.

If the new matter was filed by a slightly different group of inventors (say, Alice, Beth, and Carol as opposed to just Alice and Beth on the original application), patent law used to bar such applications under § 102(e). But 35 U.S.C. § 103(c) provides that as long as the group of inventors are the same or the assignee is the same (same employer), a prior application by one subset will not constitute prior art barring a later patent by a different subset. See 35 U.S.C. § 103(c) (2000) ("Subject matter developed by another person . . . shall not preclude patentability . . . where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person."). Thus, § 103(c) eliminates the use of § 102(e), (f), or (g) prior art for obviousness determinations when there is common inventorship or assignment. This statute closed the loophole that justified filing CIPs.

an applicant from filing an omnibus application that overwhelms the patent office, either by including too many different claims and separate inventions to examine thoroughly¹⁶² or by including inventions in disparate areas of technology that would ordinarily go to different examiners with appropriate specializations.¹⁶³ Divisionals are also less likely to be abused than are continuations and CIPs. Divisionals are a response to a restriction requirement imposed by an examiner, so the PTO and not the applicant determines when they can be used.¹⁶⁴ They tend only to be used once in any given prosecution—typically near the outset—meaning that, while a divisional may delay issuance somewhat, it cannot delay prosecution indefinitely. The requirement of consonance, which the Federal Circuit has recently interpreted strictly, can be used to prevent abuse of divisional practice by applicants who attempt to engage in sub rosa double patenting in response to a restriction requirement.¹⁶⁵ Nor can divisionals be used to obtain multiple patents on the same invention, since claims written for each divisional application must stay on the proper side of the line drawn by the PTO.¹⁶⁶ Finally, the Paris Convention expressly provides for divisionals but not for other kinds of continuation applications, and their abolition might therefore contravene U.S. treaty obligations.¹⁶⁷

¹⁶² For a proposal to introduce complexity weighing at the PTO so that more complex applications get more attention, see Allison et al., *supra* note 23 (advocating a complexity-based weighting system).

¹⁶³ They also permit the PTO to collect more fees, perhaps one reason why anecdotal evidence suggests that the PTO has been issuing more restriction requirements.

¹⁶⁴ There is some evidence suggesting that sophisticated applicants, particularly in the biotechnology field, may be intentionally filing multiple inventions in a single application in order to provoke a restriction requirement and therefore delay the prosecution of their claim. See Graham & Mowery, *supra* note 84 (observing that both the most valuable and the least valuable patents file divisional applications, suggesting that divisionals are sometimes used as a strategic tool and are sometimes a result of the applicant's ignorance of the rules). Even if this is happening, divisional applications are much less useful as a tool for delay and other forms of abuse than are continuations and CIPs.

¹⁶⁵ See, e.g., Geneva Pharms., Inc. v. GlaxoSmithKline PLC, 349 F.3d 1373 (Fed. Cir. 2003) (invalidating a patent for obviousness-type double patenting where the PTO had not clearly required separation, and where the patentee appeared to have used the divisional application in an effort to extend the term of its rights).

¹⁶⁶ 35 U.S.C. § 121 (2000). Section 121 provides that, if the PTO requires an applicant to divide an application, it cannot cite one application against the other as prior art. See *id.*; Applied Materials, Inc. v. Advanced Semiconductor Materials Am., 98 F.3d 1563 (Fed. Cir. 1996) (holding that the benefits of § 121 are retained when PTO requires a divisional application). The courts have limited this rule with the principle of "consonance." However, a patentee who crosses the line by claiming the same invention in two different divisional applications may have those applications cited against each other as prior art. Tex. Instruments, Inc. v. U.S. Int'l Trade Comm'n, 988 F.2d 1165, 1179 (Fed. Cir. 1993) (discussing the principle of consonance).

¹⁶⁷ Paris Convention for the Protection of Industrial Property, Mar. 20, 1883, art. 4(G),

The abolition of continuations and CIPs would not end all abuse of the prosecution process. Some patent applicants may craft their applications in a way that provokes a restriction requirement, permitting them to divide their application after the first office action and add perhaps fourteen months to total prosecution times.¹⁶⁸ Other applicants might seek to provoke interferences with other pending applications in the hope of delaying prosecution.¹⁶⁹ Still other applicants will choose to appeal if they can no longer file continuation applications. Appeals and interferences take a long time¹⁷⁰ and may therefore be an attractive way to delay patent prosecution. This is particularly true since the patent statute extends the patent term to compensate for delays caused by appeals and interference proceedings.¹⁷¹ But using appeals and interferences as delay tactics comes at a substantial cost. Appeals and interferences are both at least quasi-adversarial proceedings; someone argues the other side. Unlike continuation practice, where the applicant gets an unlimited number of bites at the apple, if the applicant loses in the appeal or interference process, they get nothing.¹⁷² And even if they ultimately prevail, neither appeals nor interferences permit applicants to obtain multiple patents or to obtain a narrow patent while awaiting resolution of an argument for a broader one.

13 U.S.T. 2, 828 U.N.T.S. 107, as last revised at the Stockholm Revision Conference, July 14, 1967, 21 U.S.T. 1538, 828 U.N.T.S. 303, *reprinted in* G.H.C. BODENHAUSEN, GUIDE TO THE APPLICATION OF THE PARIS CONVENTION FOR THE PROTECTION OF INDUSTRIAL PROPERTY 223, 223-52 (1968). Article 4(G)(1) provides that the patent offices may require divisionals. *Id.* art. 4(G)(1). Article 4(G)(2) provides for “voluntary divisionals” by the applicant, but only under such circumstances as each country chooses to permit. *Id.* art. 4(G)(2). While it is possible to read this to require continuation applications not based on multiple inventions, in which case abolishing continuations and CIPs might also conflict with the Convention, most countries outside the United States have not done so, and the text of the Convention gives nations broad discretion to decide when a voluntary divisional is permissible.

¹⁶⁸ Graham and Mowery offer anecdotal evidence that this does occur, particularly in the pharmaceutical and biotechnology industries. *See* Graham & Mowery, *supra* note 84.

¹⁶⁹ 35 U.S.C. § 135 provides for administrative trials when more than one party claims the same invention. An applicant can “provoke” an interference by copying the claims from a pending or issued patent into her own application. For a discussion of interference litigation, see generally Lemley & Chien, *supra* note 7 (discussing empirical results of interference litigation study).

¹⁷⁰ Interferences spend an average of 30.5 months before the PTO, and certain infamous interferences have continued for decades. *See* AM. INTELL. PROP. LAW ASS’N, COMMITTEE REPORT: PATENT—RELATIONS WITH THE U.S. PTO, at <http://www.aipla.org> (last accessed Nov 3, 2003) (data reported by PTO Board of Patent Appeals and Interferences Chief Judge Stoner).

¹⁷¹ 35 U.S.C. § 154(b)(1)(C) (2000).

¹⁷² Applicants can appeal an adverse decision by the Board to the Federal Circuit, *see* 35 U.S.C. § 141, or in the case of interferences, to a district court and then to the Federal Circuit. *See* 35 U.S.C. § 146. But, the PTO Solicitor’s office will actively defend the Board’s decision on appeal, and in the case of an interference, another interested party will also oppose the applicant’s claim.

C. *Alternatives to Abolition*

Abolishing patent continuations would require legislative action.¹⁷³ Recent experience with patent system reform suggests that this legislative change might prove controversial.¹⁷⁴ Individual inventors, who have proven surprisingly powerful in influencing Congress,¹⁷⁵ are more likely than other

¹⁷³ Continuation applications are provided for in 35 U.S.C. § 120 and CIPs in 35 U.S.C. § 132(b).

¹⁷⁴ Even modest efforts to reform the patent system in the late 1990s to harmonize it with the rest of the world proved politically divisive. Independent inventors and conservative politicians opposed harmonization. See 140 CONG. REC. 29602-03, 29609 (1994) (statements of Representatives Bentley and Rohrabacher opposing harmonization because they claimed it permitted big Japanese and multinational corporations to steal American inventors' patent rights); James J. Barta, Jr., *Death of a Superior Intellectual Property Law System*, 17 ST. L. U. PUB. L. REV. 383, 387-88, 401 (1998) (concluding that harmonization benefits Japan but hurts the United States); Dana Rohrabacher & Paul Crilly, *The Case for a Strong Patent System*, 8 HARV. J.L. & TECH. 263, 263-67, 272-73 (1995) (criticizing proposed reform for hurting American inventors and benefiting only multinational corporations). For a discussion of the political debate, see John F. Duffy et al., *Early Patent Publication: A Boon or Bane? A Discussion on the Legal and Economic Effects of Publishing Patent Applications After Eighteen Months of Filing*, 16 CARDOZO ARTS & ENT. L.J. 601, 604 (1998) (identifying a political division between large corporations and small inventors); Stephanie Gore, "Eureka! But I Filed Too Late...": *The Harm/Benefit Dichotomy of a First-to-File Patent System*, 1993 U. CHI. L. SCH. ROUNDTABLE 293, 307-09 (1993) (analyzing harmonization from a theoretical perspective); Mark A. Lemley, *An Empirical Study of the Twenty-Year Patent Term*, 22 AIPLA Q.J. 369, 376-82 (1994) (highlighting submarine patents as a primary focus of political controversy). On the power of the small inventor as an icon, see Mark D. Janis, *Patent Abolitionism*, 17 BERKELEY TECH. L.J. 899, 910-22 (2002) (observing that the "heroic inventor motif" prevails in literature, debate, and judicial opinions).

This political firestorm delayed patent reform for several years, and when reform did come, it was so watered down as to be completely ineffective. For example, the U.S. patent law now includes eighteen-month publication, a twenty-year term, a limited prior user right, and an inter partes opposition procedure. 35 U.S.C. §§ 154(a)(2), 122(b), 271, 311-318 (2000). In each case, however, Congress so watered down the new provisions that they bear little resemblance to their foreign counterparts. Thus, the twenty-year term is riddled with extensions, see 35 U.S.C. § 154(b); eighteen-month publication is required only for inventors who also file abroad, see 35 U.S.C. § 122(b)(1)(B); the prior user right applies only to business method patents, and even then only in extreme cases, see 35 U.S.C. § 273(b)(3); and the opposition procedure is so anemic and the estoppel consequences so severe that virtually no one seems willing to use it. See 35 U.S.C. §§ 311-318; U.S. PATENT & TRADEMARK OFFICE, INTER PARTES REEXAMINATION FILING DATA (Dec. 31, 2002) (stating that only seven inter partes reexamination requests were filed between 1999 and 2002, compared with 6501 normal reexamination requests). For a description of those shortcomings, see Mark D. Janis, *Inter Partes Patent Reexamination*, 10 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 481, 483-85 (2000) (criticizing reexamination reforms as being ineffective and frustrating to use).

¹⁷⁵ See Janis, *supra* note 174, at 918-19 (observing that changes in the AIPA "bear the

inventors to abuse the continuation process,¹⁷⁶ and they may object to outright abolition. Further, the patent bar organizations are predominantly composed of patent prosecutors, who stand to lose some of their business if patent prosecution becomes less protracted. As a result, they would likely object to such a proposal as well. The primary beneficiaries of abolition—companies who make products that might be the subject of patent hold-up and the customers who pay a lower price for those products—have a diffuse interest and might not organize around a reform measure.

In addition to the fact that legislative reform may be difficult to achieve, abolition may be an overly broad remedy. The number of patentees who abuse continuation practice seems to be small¹⁷⁷ and may not justify such a sweeping change to long-standing patent practice. Thus, in this section, we propose a number of partial steps Congress or the courts might take to address the abusers. We address five possible ways to restrict the abuse of continuation practice in a world in which the continuation application remains a reality.

1. Limiting the Number of Continuations

Even if policymakers conclude there are good reasons to permit patentees to file continuation applications in an effort to argue for the claims they want, those reasons don't justify an unlimited number of continuation applications. A compromise proposal might, therefore, limit each applicant to no more than one continuation application or CIP. In each application, the inventor has at least two, and generally more, attempts to persuade the examiner that the applicant's position is correct.¹⁷⁸ Allowing even one continuation application

unmistakable influence of lobbying on behalf of independent inventors”).

¹⁷⁶ Individuals obtained 26% of the continuation patents with delays of twenty years or more. Although individuals are actually less likely to file continuations generally (individuals obtain 18% of all issued patents and 15% of all continuation patents), a few highly visible individual inventors are more likely to abuse the practice by filing multiple continuations stretching prosecution out many years. *Cf.* Allison & Lemley, *supra* note 20, at 2140 (finding “no [statistically] significant relationship between entity size and the number of continuation applications filed”).

¹⁷⁷ See Table 1, *infra* Appendix A (showing that less than 1% of all patents take more than nine years to issue).

¹⁷⁸ An applicant presents an initial set of claims, faces an initial rejection, gets at least one chance to amend the claims or argue for the original claims before facing a final rejection, and then usually gets an opportunity for an off-the-record personal or telephonic interview with the examiner. For a discussion of this process, see John R. Thomas, *On Preparatory Texts and Proprietary Technologies*, 47 UCLA L. REV. 183, 188-89 (1999) (describing the series of steps an applicant must take before obtaining a patent). A striking number of claims that are “finally rejected” before the interview end up being allowed with little or no explanation after the interview. See MERGES ET AL., *supra* note 9, at 116-17 (demonstrating the various ways a “final rejection” is not really final); see also *supra* note 11 and accompanying text (discussing the lack of information in an “interview summary”).

will give the applicant five or six bites at the apple. Surely that is enough.¹⁷⁹

Eliminating multiple continuation applications would also deal with the worst abusers of the system. In the past, a small number of applicants have filed a large number of continuation applications. For example, of the thirty-three patents with the longest prosecution delays (thirty-two to nearly fifty-four years), twenty-three of them belong to Jerome Lemelson and five belong to George Sawyer. Of the remaining five, two took so long because of secrecy orders restricting their issuance.

Multiple continuations can be harmful in another way: they confuse the public. One U.S. patent claims priority to ninety-eight different related applications.¹⁸⁰ This patent claims to be a continuation-in-part of seventeen different applications, each with their own priority chains. For these types of patents, there is no way the public can have any idea which claims are entitled to which priority date or when the various claims will expire. Although it is unusual to have this many priority claims—the mean for all issued patents is a claim of priority to 0.36 applications—the example demonstrates the confusion that continuation practice can cause.

Limiting the number of continuations that can be filed may require an act of Congress. In *In re Henriksen*,¹⁸¹ the PTO sought to preclude applicants from filing more than three continuation applications in any one prosecution. The Court of Customs and Patent Appeals, the Federal Circuit's predecessor court, struck down the PTO regulation, concluding that § 120 by its terms did not impose any limit on the number of continuations and that whether there should be such limits "is for Congress to decide."¹⁸²

2. Preventing Broadening of Claims During Continuation Applications

One of the most egregious abuses of continuation applications described above is the use of the process to change patent claims to track inventions first made by one of the applicant's competitors.¹⁸³ Central to this abuse is the applicant's ability not only to change claims during prosecution, but also to broaden those claims to cover inventions that may or may not be supported in the initial disclosure but are not within the scope of the claims as initially filed. Permitting applicants to broaden claims allows them to correct errors, and it may be important to do so if failing to claim the full range of an invention

¹⁷⁹ Of course, the patentee could still use the reissue process within two years of the patent issuance to argue once again for broader claims, in effect giving the applicant yet another chance. 35 U.S.C. § 251 (2000).

¹⁸⁰ U.S. Patent No. 5,714,566 (issued Feb. 3, 1998). Similarly, U.S. Patent 5,640,805 claims priority to eighty-two different applications through ten different application chains. See U.S. Patent No. 5,640,805 (issued June 24, 1997).

¹⁸¹ 399 F.2d 253 (C.C.P.A. 1968).

¹⁸² *Id.* at 262.

¹⁸³ See *supra* Part II.A (describing this abuse).

would also disable an applicant from relying on the doctrine of equivalents.¹⁸⁴ But it also invites abuse of the system.

One partial solution to this problem is to permit applicants to file continuation applications but refuse to allow them to broaden the scope of their claims during the prosecution of those applications.¹⁸⁵ Patentees would have to correct any unintended narrowness in their claims during the prosecution of the initial application or, alternatively, in a reissue proceeding within two years after the patent issued.¹⁸⁶ They could file continuation applications to persuade the PTO that they were entitled to broad claims that they originally filed, or to narrow their claims sufficiently to make them patentable. But they could not capture new ground with claims offered for the first time in a continuation application. This approach would address one specific abuse associated with continuation applications. It would also impose many of the same burdens on patent prosecutors as abolishing continuations, however, and would do nothing about delay, secrecy, or multiple patenting.¹⁸⁷

3. Publishing Applications

Another alternative would be to institute more meaningful publication requirements. A first step, since the exceptions at present threaten to swallow the rule, is to eliminate the “optional” nature of publication. Publishing all applications regardless of whether the applicant intends to file abroad would minimize the surprise associated with submarine patents. Moreover, the creation of provisional damages for those who infringe published applications that ultimately issue¹⁸⁸ mitigates the threat to inventors of having their published technology usurped during the pendency of the patent prosecution.¹⁸⁹ Provisional rights give patentees a reasonable royalty for

¹⁸⁴ *Johnson & Johnston Assoc., Inc. v. R.E. Serv. Co.*, 285 F.3d 1046, 1055 (Fed. Cir. 2002) (en banc) (holding that a patentee cannot claim doctrine of equivalents protection for disclosed but unclaimed items). See *supra* notes 148-151 and accompanying text (discussing this rule).

¹⁸⁵ If abuse of the appeal and interference processes were determined to be a significant problem, this proposal could also be applied to prosecution after a successful appeal or interference proceeding.

¹⁸⁶ Broadening reissues, unlike continuation applications, give “intervening rights” to companies who started using an invention covered by the newly broadened claims before those claims were issued. 35 U.S.C. § 252 (2000) (allowing courts to convey such intervening rights as equity requires). The reissue process therefore protects against unscrupulous applicants who change their claims to track their competitors’ new inventions.

¹⁸⁷ Limiting continuations may also encourage patent attorneys to game the system by initially filing overly broad claims and then systematically narrowing; this would preserve the right to file broader claims in a continuation. But doing so would create problems of prosecution history estoppel for patentees, and so it is unlikely to be a major concern.

¹⁸⁸ 35 U.S.C. § 154(d) (2000) (creating a provisional right against patent infringements involving published applications).

¹⁸⁹ The fact that a patent, when it issues, will be enforced by injunctive relief, see 35

infringement that occurs after publication but before patent issuance, provided that the infringer has actual notice of the published application and that the infringer would have infringed under both the published version of the claims and the issued version of the claims.¹⁹⁰ Requiring infringement to occur under both versions of claims is beneficial because it creates an incentive to have the broadest claims included in the application from the beginning. If broader claims are added after publication, and the infringer would not have infringed the published claims, the patentee has no cause of action for the infringement until after the patent issues. Closing loopholes in the publication requirement would help minimize the uncertainty associated with submarine patents, but it would do nothing about delay, multiple patenting, or filing subsequent claims to cover a competitor's technology.

4. Creating Intervening Rights

Another alternative that would eliminate many of the perils of submarine patents would be the creation of intervening rights for competitors who began making, using, or selling the patented invention prior to the broadening continuation.¹⁹¹ The Federal Trade Commission recently called for the creation of such intervening rights in its comprehensive report proposing reforms to the patent system.¹⁹² Intervening rights already protect competitors from situations where the patentee broadens issued patent claims to cover their products through a reissue patent.¹⁹³ Intervening rights for broadening continuations could work the same way.¹⁹⁴ Continuation-based intervening

U.S.C. § 283 (2000), also makes such use of inventions disclosed in pending applications unlikely. A company that produces infringing products based on a published patent application knows that it will soon have to shut down production once the patent issues. Further, anyone who learns of a technology from a published patent application will likely be a willful infringer subject to treble damages.

¹⁹⁰ 35 U.S.C. § 154(d).

¹⁹¹ The Federal Trade Commission recently proposed the creation of intervening rights in continuation practice in its comprehensive proposals for reform of the patent system. See FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY 16 (Oct. 2003), available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last accessed Jan. 14, 2004) (recommending that Congress enact legislation creating intervening and prior user rights in continuation practice).

¹⁹² *Id.*

¹⁹³ For a discussion of equitable and absolute intervening rights in the context of broadening reissue, see Timothy R. Holbrook, *Liability for the "Threat of a Sale"*, 43 SANTA CLARA L. REV. 751, 769-70 (2003) (explaining that absolute rights guarantee competitors relief in cases of broadening reissue, and equitable rights allow competitors to continue infringing activities); see also J. Christopher Carraway, *The Uncertain Future of Enforcing Patents that Have Been Broadened Through Reissue*, 8 FED. CIR. B.J. 63, 66-70 (1998) (describing the requirements for obtaining equitable and absolute intervening rights).

¹⁹⁴ The Federal Circuit declined to create such a doctrine judicially in *Ricoh Co. v. Nashua Corp.* 185 F.3d 884, 1999 WL 88969, *3 (Fed. Cir. Feb. 18, 1999) (unpublished

rights could limit liability to those circumstances when the infringer would have infringed both the claims in the original application and the ultimately issued continuation patent claims. Although claim construction and infringement determinations for a single claim are hard enough, and this test would double the court's workload by requiring it to determine infringement of both claims, there is an established body of law on both whether a reissue is broadening¹⁹⁵ and the scope of intervening rights.¹⁹⁶ The "substantial identity" test used for both reissue-based intervening rights and the new provisional rights accorded to published applications could be applied to continuation-based broadening of claims as well.¹⁹⁷

Another model for reform besides intervening rights in reissues and provisional rights for published applications is the prior user right. Many European countries grant a limited right to independent developers to continue using technology they developed before the patent issued.¹⁹⁸ In the United

decision) (holding that intervening rights are reserved for broadening reissue patent and not available for broadening continuations). *Ricoh* is an unpublished decision of the Federal Circuit and therefore is not binding precedent. In any event, there is nothing that would prevent Congress from creating such a right expressly.

¹⁹⁵ See, e.g., *Hockerson-Halberstadt, Inc. v. Converse, Inc.*, 183 F.3d 1369, 1374 (Fed. Cir. 1999) (stating that an amended claim is impermissibly broadened if it includes material that would not have been infringing under original claim); *Vectra Fitness, Inc., v. TNWK Corp.*, 162 F.3d 1379, 1384 (Fed. Cir. 1998) (holding that original patent does not bind reissue claims that are part of a disclaimer); *Mentor Corp. v. Coloplast, Inc.*, 998 F.2d 992, 994 (Fed. Cir. 1993) (finding reissue claims invalid because not based on "error" but deliberately changed to avoid prior art).

¹⁹⁶ See, e.g., *Shockley v. Arcan, Inc.*, 248 F.3d 1349, 1360-61 (Fed. Cir. 2001) (limiting absolute intervening rights to articles manufactured before patent reissuance and equitable intervening rights to non-willful infringement); *BIC Leisure Prods., Inc. v. Windsurfing Int'l, Inc.*, 1 F.3d 1214 (Fed. Cir. 1993) (allowing general intervening rights defense when infringed claims were not in original patent and absolute intervening rights for articles manufactured before reissuance).

¹⁹⁷ See Philippe Signore, *The New Provisional Rights Provision*, 82 J. PAT. & TRADEMARK OFF. SOC'Y 742, 752-54 (2000) (analogizing the "substantial identity" test for provisional rights to the test for reissue-based rights).

¹⁹⁸ Robert Merges has called for a system of prior user rights on the European model, and a number of commentators have suggested the creation of a limited defense of some sort for independent inventors. See, e.g., Stephen M. Maurer & Suzanne Scotchmer, *The Independent Invention Defense in Intellectual Property*, 69 ECONOMICA 535, 536 (2002) (presenting the economic benefits of an independent inventor defense, including lower market price and reduction of duplicate research and development); Michelle Armond, Comment, *Introducing the Defense of Independent Invention to Motions for Preliminary Injunctions in Patent Infringement Lawsuits*, 91 CAL. L. REV. 117, 139-47 (2003) (proposing an independent invention affirmative defense to preliminary injunctions); John S. Liebovitz, Note, *Inventing a Nonexclusive Patent System*, 111 YALE L.J. 2251, 2273-74 (2002) (considering an independent invention defense as a logical yet controversial step toward nonexclusive patent reform).

States, recent legislation established a prior user right defense to patent infringement for business method patents.¹⁹⁹ Under that provision, prior user rights exist as a defense to infringement if the prior user reduced the invention to practice more than one year before the patent claims were filed and commercially used the invention before the claims were filed.²⁰⁰

While intervening rights would minimize the use of continuations to obtain claims to read on a competitor's product where the patentee had not contemplated the embodiment prior to seeing the competitor's device²⁰¹—a particularly offensive practice—it would not solve other continuation-based problems. For example, intervening rights would not eliminate attempts to wear down the examiner by fighting over-and-over again for broad claims.

5. Limiting the Time an Application Can Spend in Prosecution

An alternative to abolishing or restricting the use of continuation applications is to permit the use of those applications, but to set an independent limit on the amount of time an application can spend in prosecution. Unlike our other proposals, this one can be implemented retroactively and without legislative reform. Indeed, the Federal Circuit has done something very similar in the last two years by creating a new equitable defense of continuing prosecution laches.²⁰² If continuation applications persist, this new doctrine serves an important function in preventing abuses of the system, though as we noted above, the fact that it is applied after the fact makes it far from a perfect solution. The major problems with the laches doctrine are: (1) the parameters

¹⁹⁹ 35 U.S.C. § 273(b) (2000) (allowing the defense to infringement for business method patents only).

²⁰⁰ *Id.*

²⁰¹ We say minimize rather than eliminate because we can envision circumstances where applicants could game the system to avoid intervening rights. For example, imagine a situation where the applicant filed a few extremely broad claims initially, even though she knew these claims would be rejected, then prosecuted more narrow claims, and then later filed a continuation with claims to read on a competitor's device that were broader than those obtained, but narrower than those originally applied for. In this circumstance, the originally filed claims would likely have been broad enough to cover the competitor and therefore, no intervening rights would likely arise.

²⁰² See, e.g., *In re Bogese*, 303 F.3d 1362, 1369 (Fed. Cir. 2002) (affirming PTO's finding of prosecution history laches because applicant's prosecution delay was unreasonably long); *Symbol Techs., Inc. v. Lemelson Med. Ed. & Res. Found.*, 277 F.3d 1361, 1363 (Fed. Cir. 2002) (creating a prosecution history laches defense for unreasonable and unexplained delay even if applicant complied with statutes). A district court opinion has confirmed that the doctrine of prosecution laches applies even to applications subject to the twenty-year term, see *Digital Control, Inc. v. McLaughlin Mfg. Co.*, 225 F. Supp. 2d 1224, 1227 (W.D. Wash. 2002) (refusing to limit the defense to applications filed before the GATT extension), though the court refused to find prosecution laches in the case before it, at least on summary judgment. *Id.* at 1242.

of the doctrine and its application are not, at present, well defined;²⁰³ and (2) courts lack clear standards and hard evidence upon which to base a decision on reasonableness. In order for it to be effective, the doctrine needs some certainty. Both applicants and competitors should have a decent idea about when the doctrine will apply. While the first problem will likely correct itself in time, the second may not. The defense will become better defined as the Federal Circuit has an opportunity to evaluate laches cases and precedent on the issue evolves. One of the major contributions of our empirical research is to help facilitate the laches analysis by providing evidence on the distribution of prosecution delays. This evidence will provide courts with a baseline for their reasonableness analysis. Our research will offer some guidance on the applicability of the defense as well.

To date, only one district court has actually applied prosecution laches to any of the patents in which the defense was raised.²⁰⁴ The Federal Circuit held

²⁰³ *Reiffin v. Microsoft Corp.*, 270 F. Supp. 2d 1132, 1149 (N.D. Cal. 2003) (stating “the *Symbol* court did little to clarify the elements of the defense, its scope or the burden of proof required to demonstrate it”); see also Michael T. Hawkins, *Prosecution Laches in the Wake of Symbol Technologies: What is “Unreasonable and Unexplained” Delay?*, 87 MINN. L. REV. 1621, 1648 (2003) (“Although the ultimate conclusion of the *Symbol Technologies* court was well reasoned, the court provided little guidance on how to apply the doctrine.”); Jennifer C. Kuhn, *Symbol Technologies: The (Re)Birth of Prosecution Laches*, 12 FED. CIR. B.J. 611, 611-612 (2003) (criticizing the revived laches defense for its uncertainty and lack of guidance).

²⁰⁴ *Symbol Techs., Inc. v. Lemelson Med. Ed. & Research Found.*, No. CV-S-01-703-PMP(RJJ), 2004 WL 161331 (D. Nev. Jan. 23, 2004) (holding Lemelson’s patents in issue unenforceable for prosecution laches on the basis of several decades of delay). Other courts have not found prosecution laches to apply despite some pretty lengthy prosecutions. See, e.g., *Reiffin*, 270 F. Supp. 2d at 1156-59 (denying summary judgment of laches for delays in prosecution of eleven years from the claimed priority date to when the claims at issue were added during prosecution); *Cummins-Allison Corp. v. Glory Ltd.*, No. 02 C 7008, 2003 WL 355470, at *2, *25 (N.D. Ill. Feb. 12, 2003) (denying preliminary injunction because defendant did not prove a likelihood of success of prosecution laches where delay was more than ten years from the earliest claim of priority to the filing of the claims at issue); *Stambler v. RSA Sec., Inc.*, 243 F. Supp. 2d 74, 74-75 (D. Del. 2003) (finding no unreasonable delay as a matter of law where the delay between the original claim to priority and the issuance of the final patent was approximately seven years); *Intuitive Surgical, Inc. v. Computer Motion, Inc.*, No. 01-203-SLR, 2002 WL 31833867, at **4-6 (D. Del. Dec. 10, 2002) (finding no laches where delay from earliest claim of priority to issuance was nearly nine years); *Digital Control, Inc.*, 225 F. Supp. 2d at 1228 (granting patentee summary judgment of no laches even where delay from earliest priority to issue was 10 years, 2.5 months); cf. *John Mezzalingua Assocs. v. Corning Gilbert, Inc.*, No. 03-C-354-S (W.D. Wis. Nov. 20, 2003) (refusing to find prosecution laches where the prosecution took less than six years). But cf. *Chiron Corp. v. Genentech, Inc.*, 268 F. Supp. 2d 1139, 1143-44, 1148 (E.D. Cal. 2002) (denying summary judgment to patentee on laches issue because delay of more than fifteen years from earliest filing date to issuance was unexplained). The only case in which prosecution laches was found, *In re Bogese II*, the PTO held claims unenforceable where the applicant filed twelve continuations, each on nearly the last possible day, each

that laches ought to apply to bar the enforceability of a patent when there was “an unreasonable and unexplained delay” in prosecution.²⁰⁵ What the laches cases decided thus far have lacked was evidence regarding normal, median, mean, or “reasonable” prosecution times. If the judges do not have a baseline for assessing how long is too long, then they will have difficulty finding a particular delay unreasonable, especially where both sides present patent experts with opposing opinions on the issue.²⁰⁶ The empirical results presented in this article provide a baseline for assessing the reasonableness of prosecution length.

As Figure 3 shows, the median amount of time patents spend in prosecution from their earliest filing date to issuance is 2.04 years; the mean is 2.47 years. Figure 3 plots the distribution of patents by the amount of time spent in prosecution. Figure 4 is an inverse cumulative plot of patent prosecution time. At any given year on the X axis, it plots the percentage of patents still in prosecution. For example, eight years after a filing date, only 1.38% of all patent applications are still pending.

We suggest that any patent pending eight years or longer ought to automatically be subject to scrutiny for laches²⁰⁷—a presumption of laches.²⁰⁸

after a final rejection, and each with no claim changes or amendments. 303 F.3d at 1363-66, 1369 (holding applicant forfeited patent rights through unreasonable delay). This delay in prosecution spanned nearly eight years, from April 6, 1987 to January 23, 1995. *Id.* at 1364-65 (detailing the extensive case history). Prior to these delays, Bogese had actually appealed rejections to the Board and then to the Federal Circuit, but the court did not consider this to be part of the unreasonable delay. *Id.* *Bogese* is a textbook case of trying to wear down the examiner.

²⁰⁵ *Symbol Techs., Inc.*, 277 F.3d at 1363.

²⁰⁶ It also encourages litigants to take unreasonable positions. In *John Mezzalingua Assocs.*, No. 03-C-354-S (W.D. Wis. Nov. 20, 2003), for example, the defendant argued that a prosecution that lasted two years was presumptively unreasonable. Given that the average prosecution lasts 2.77 years, *see Allison & Lemley, supra* note 20, at 2199, the court was clearly correct to reject this claim on summary judgment.

²⁰⁷ While 1.38% does not sound like a lot, in raw numbers it can actually be quite intimidating. As Table 1 indicates, 30,649 patents took eight years or longer from earliest filing date to issuance. *See* Table 1, Appendix A. Many of these patents, however, have already expired since they issued more than seventeen years ago, leaving 23,789 patents still potentially enforceable. Undoubtedly some of these patents would have expired due to failure to pay maintenance fees making the raw number even smaller. While an eight year presumption would potentially call into question 23,789 issued patents, it is important to keep in mind that while approximately 150,000 patents issue each year, only about 3000 end up being litigated and 75% of the litigated cases settle. In short, the raw number of patents encompassed by the eight-year rule is not likely to be unreasonably large.

²⁰⁸ This is not to say that patents that take less time to prosecute could not be guilty of laches. We have just selected eight years as a benchmark period that ought to always trigger a laches inquiry. The Federal Circuit created a similar presumption for litigation laches, which was triggered at the six-year point, in *A.C. Aukerman Co. v. R.L. Chaides Construction Co.*, 960 F.2d 1020, 1028 (Fed. Cir. 1992) (en banc) (creating presumption of

Fig. 3: Distribution of Patents by Years in Prosecution

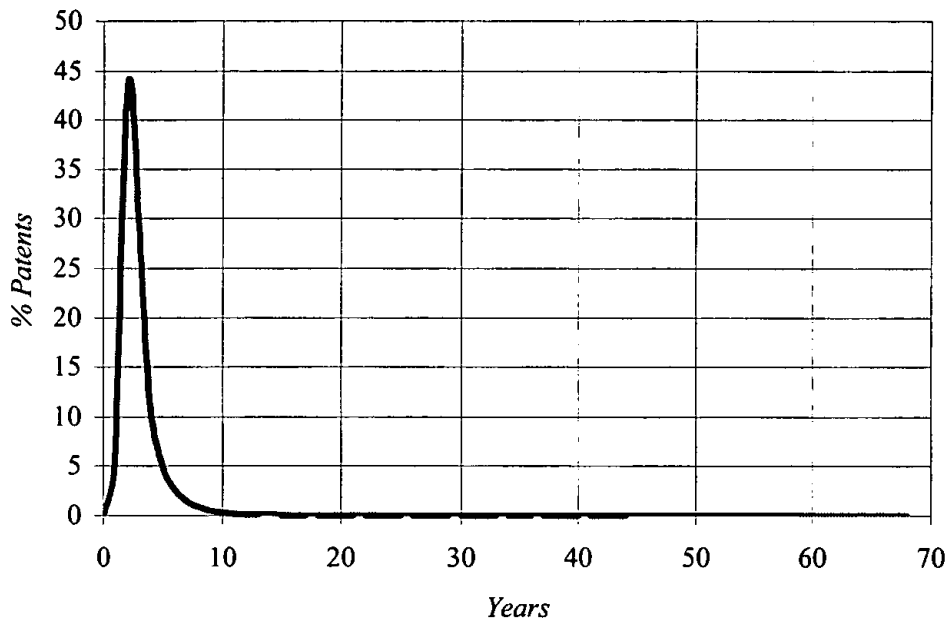
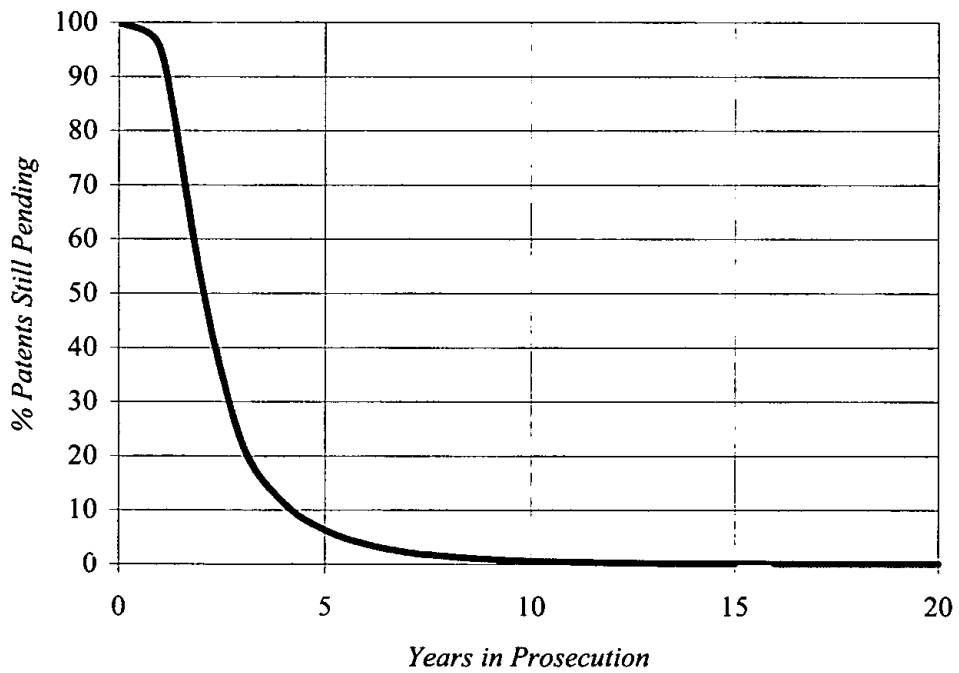


Fig. 4: Patents Still Pending By Year



laches six years after patentee knew or should have known about infringement).

Eight years is more than three standard deviations from the mean of 2.47 years.²⁰⁹ Although the mean amount of time an application spends in prosecution varies somewhat by technology, that variation is not so great that an eight-year presumption would be unreasonable. For example, measuring the time from the most recent filing date to issuance date of the patents issued in each technological class,²¹⁰ the technology class with the shortest mean (1.53 years) was class 150 (Purses, Wallets, and Protective Covers) and the technology class with the longest application time (3.18 years) was class 380 (Cryptography). The difference in prosecution time may be somewhat related to the complexity of the technology, but in the case of cryptography, many of the patents that issued in this class were delayed because of secrecy orders related to national security issues. Having reviewed the data on each technology class, we conclude that while there is variation by class, the eight-year presumption is fair to all classes and, absent other factors,²¹¹ differences in technology do not justify different presumptive laches periods. Moreover, the PTO examiners are technically trained in the relevant field.²¹² While

²⁰⁹ The mean time in prosecution of all patents granted from 1976 to 2000 is 2.4690 years. The standard deviation is 1.6295. Hence, three standard deviations away from the mean is 7.3575. An eight-year presumption is thus more than three standard deviations away from the mean prosecution time.

²¹⁰ If we measured time from earliest claim of priority to issuance the difference is more substantial. The class with the shortest mean was class 38 (Textiles: Ironing or Smoothing) with a mean prosecution time of 1.68 years. The class with the longest prosecution time of 4.08 years was class 530 (Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reactions Products Thereof). This variation is almost entirely attributed to the likelihood that members of each class filed continuations and multiple continuations. In class 38, only 7% of all applications claim priority to earlier filed applications (small number of continuations). In class 530, 50% of all patents were continuations. The complexity of the technology may of course have some impact as well. In class 38, time from filing to issuance was 1.58 and in class 530 it was 2.52 years. Examiners, however, are educated in the technical field in which they review applications, which ought to diminish the impact of technical complexity on prosecution time.

²¹¹ Since the number of claims and prior art references cited did significantly affect prosecution, we believe that a court in determining whether the delay is unreasonable could consider these factors. A large number of claims and prior art references may cause the examiner to spend more time on the application or may cause the examiner to put off examination due to the complexity. In either event, lengthy prosecution in this case would be due to PTO delay, not applicant delay. Of course, to be a reason for the delay, the large number of claims and prior art would have to be present in each of the applications in the chain. If an applicant files 10 claims initially with several continuations and finally files a continuation with 100 claims ten years after the initial filing, the number of claims cannot be said to have caused the ten-year delay.

²¹² In addition to their technical degrees in the relevant field (for example, in biotechnology the PTO almost never hires examiners without a Ph.D. in biology), the

Cryptography would certainly be more complex than wallets to a lay observer, examiners are not laymen.

The eight-year presumption of prosecution laches would be measured from the earliest continuation filing date to which the patentee claims priority to the issuance date.²¹³ While eight years ought to trigger the presumption, it still may be possible for laches to apply for shorter periods of delay, if such delay was unreasonable. A laches presumption is logical as it also mirrors the litigation laches presumption. If a patentee delays filing suit longer than six years from when she knew or should have known of a potential infringer, a presumption of laches arises.²¹⁴ Of course, like litigation laches, the prosecution laches presumption ought to be rebuttable. If the patentee can demonstrate that the delay was not unreasonable, but instead there was a legitimate reason why prosecution took so long, then she ought to be able to overcome the presumption. We can think of several reasons that ought to rebut the presumption: (1) delay caused by an appeal to the Board, the district court, or the Federal Circuit, (2) delay caused by an interference, (3) delay caused by PTO error, or (4) delay caused by a secrecy order that prohibited the patent from issuing.

Patentees should not be able to defend against the presumption merely on the grounds that they did not break any laws by filing multiple continuations. That argument, if accepted, would defeat the doctrine of prosecution laches entirely. Prosecution laches is an equitable defense and therefore ought to apply even where a patentee did not violate the letter of the law, but where equity would dictate that the unreasonable delay renders the patent unenforceable. Moreover, arguments that an applicant decided to prosecute

examiners also become acquainted with the technology by repeatedly examining applications in the same field.

²¹³ We recognize that there could be many ways to measure the relevant time period for laches inquiries. We propose the simplest—measure from earliest claim of priority to issuance. Of course we could alternatively measure from the filing date of the patent to which priority is claimed to the filing date of the claims being asserted in the issued patent. This would measure how long the patentee delayed in filing the relevant claims. Such a measure would entirely forgive patentees who file the same claims over and over to wear down the examiner, which we think should not be encouraged. A measure from filing date to filing date would encourage patentees to file exceptionally broad claims initially then prosecute the narrower ones iteratively. That way they could have lengthy delays, but claim to be immune from laches because they had filed the broad claims initially. Measuring from filing date to filing date would also open the door to disputes regarding the scope of the original claims. Patentees would undoubtedly argue that their original (rejected) claims did in fact cover the embodiments claimed in continuations. This would cause district courts to suffer through construction of not only the claims at issue, but also rejected claims from earlier applications.

²¹⁴ See *A.C. Aukerman Co.*, 960 F.2d at 1028 (creating a six-year litigation laches presumption).

her applications in series rather than in parallel,²¹⁵ or filed a terminal disclaimer,²¹⁶ should not be sufficient to overcome the presumption. The harms from laches are twofold: (1) “unreasonably delaying the issuance of a patent and attendant publication of an invention for the purpose of maximizing its commercial value” and (2) unduly postponing the time when the public can have free use of the invention (extending the monopoly period).²¹⁷ Filing a terminal disclaimer may obviate the second harm caused by unreasonable delay—the monopoly is not extended—but it does not address the first harm, and is therefore not an explanation sufficient to overcome laches.

Finally, unlike litigation laches, prosecution laches ought to be a one-part test: whether the patentee delayed prosecution for an unreasonable length of time.²¹⁸ While litigation laches also requires proof that the delay operated to the prejudice or injury of the defendant,²¹⁹ prosecution laches ought not have such a requirement.²²⁰ Unlike litigation laches, which is designed to preserve

²¹⁵ Serial prosecution means that the applicant decided to prosecute the applications one at a time. Hence she would turn to the new application only after the old one was finished. In general, we have no problem with this approach to prosecution, but we think that the applicant ought not be entitled to the earlier filing date of the continuation application unless she is actually continuing the patent prosecution. A decision to prosecute in series is not meaningfully advancing prosecution on each application.

²¹⁶ Patentees may argue that the filing of a terminal disclaimer eliminates the extension of the monopoly that may result from the delay. This generally matters only for applications filed before the change to the twenty-year patent term.

²¹⁷ *Reiffin v. Microsoft Corp.*, 270 F. Supp. 2d 1132, 1154 (N.D. Cal. 2003) (citing *Woodbridge v. United States*, 263 U.S. 50, 58, 60 (1923)).

²¹⁸ As an equitable doctrine, prosecution laches is for the court—not the jury—to decide, and it seems as though it would most always be resolvable on summary judgment. Moreover prosecution laches, if it applies, ought to render the entire patent unenforceable, just as such other equitable defenses as equitable estoppel and inequitable conduct.

²¹⁹ See *A.C. Aukerman Co.*, 960 F.2d at 1032 (explaining the two-part test for litigation laches).

²²⁰ Indeed, it is hard to see how a particular competitor could specifically rely on the absence of a patent. See *Reiffin*, 270 F. Supp. 2d at 1154 (asserting that proof of unreasonable delay should be the only factor in the prosecution laches inquiry). “Prosecution laches is not a doctrine, like traditional laches, aimed to protect specific competitors. It rather serves the broader public interests in the timely issuance of patents.” *Id.* But see *In re Certain Data Storage Sys. & Components Thereof*, Order No. 47 (Int’l Trade Comm’n Jan. 24, 2003) (rejecting claim of prosecution laches because Hitachi could not show that it had suffered “material prejudice” from a seven-year prosecution delay).

In *Symbol Technologies, Inc.*, the Federal Circuit sought to reconcile the early Supreme Court cases on prosecution laches by concluding that laches applied only where someone—even if not the defendant in suit—had independently developed the product during the years of prosecution delay. *Symbol Techs., Inc. v. Lemelson Med. Ed. & Res. Found.*, 277 F.3d 1361, 1364-65 (Fed. Cir. 2002). This might be viewed as a sort of reliance interest: a requirement that someone be disadvantaged by a material change in position that arguably would not have occurred but for the delay in prosecution. To date, the Federal Circuit has

the validity of a patent while preventing injustice to a particular defendant who relied on the patentee's acquiescence, prosecution laches is intended to render the patent unenforceable as a whole. Litigation laches is a personal defense whereas prosecution laches, like validity, is a public defense. Even if the Federal Circuit should subsequently find that proof of both unreasonable delay and material prejudice are required, when our presumption applies (the patent was prosecuted eight years or longer), a prima facie case of laches is made, and both unreasonable delay and material prejudice ought to be inferred.²²¹

CONCLUSION

Continuation applications have led to abuse of the patent prosecution process. They serve very little useful purpose, and what benefits they confer may be outweighed by their potential for mischief. The world would probably be a better place if continuation applications were abolished. Recognizing, however, that the abuse of continuation practice is not as pervasive as some might think, we propose a number of means by which Congress and the courts could strengthen existing rules designed to limit their abuse while preserving the practice.

not decided whether such a delay is an element of a prosecution laches defense. For the reasons stated in text, we think it should not be an element.

²²¹ If the Federal Circuit concludes that proof of material prejudice is required, then adoption of one's technology and use in commerce prior to the filing by the patentee of the broader claims ought to suffice to establish such prejudice. It seems that prejudice would be even clearer if the patentee obtained a related patent with narrower claims (such as a parent or grandparent), the infringer adopted and used technology it believed designs around the claims, and the patentee then filed broader claims to read on the infringer's device. Such facts ought to amount to material prejudice and give rise to intervening rights or render the patent unenforceable at least against that competitor. The problem with rendering the patent unenforceable against everyone in this circumstance is that the prejudice against a single competitor may not exist for the industry at large.

APPENDIX A
(Table 1: Issued Patents 1976-2000: Total Prosecution Time)

Appendix A

Table 1: Issued Patents 1976-2000: Total Prosecution Time

YEAR ¹	# of Patents	Distribution (%) ²	Cumulative #	Cumulative (%) ³	Inverse Cum. (%) ⁴
0	3	0.00	3	0.00	100.00
1	109122	4.91	109125	4.91	95.09
2	964672	43.37	1073797	48.27	51.73
3	655935	29.49	1729732	77.76	22.24
4	243742	10.96	1973474	88.72	11.28
5	111275	5.00	2084749	93.72	6.28
6	58273	2.62	2143022	96.34	3.66
7	32145	1.45	2175167	97.79	2.21
8	18576	0.84	2193743	98.62	1.38
9	10747	0.48	2204490	99.11	0.89
10	6620	0.30	2211110	99.40	0.60
11	4168	0.19	2215278	99.59	0.41
12	2754	0.12	2218032	99.71	0.29
13	1822	0.08	2219854	99.80	0.20

¹ Year is measured as follows: Year 0 is zero years, Year 1 includes everything greater than zero and less than one, Year 2 includes one up to two years, Year 3 includes two up to three years, and so on.

² Distribution is the distribution of patents that took a particular number of years to issue. For example, Year 0 measures all patents with a prosecution time of zero years; Year 1 measures all patents with a prosecution time from zero up to one year; Year 2 measures all patents with a prosecution time of one year up to two years, and so on.

³ Cumulative measures all patents that took that long or less to issue. For example, Year 0 measures all patents with a prosecution time of zero years, Year 1 measures all patents with a prosecution time of less than one year; Year 2 measures all patents with a prosecution time of less than two years (this includes all patents with a prosecution time of zero years up to two years); Year 3 measures all patents with a prosecution time of less than three years (this includes all patents with a prosecution time of zero up to three years), and so on.

⁴ Inverse cumulative measures all patents that were still pending at the PTO at the given year. For example, Year 0 measures the number of patents still pending at the PTO (100%), Year 1 measures the patents still pending after one year (95.09%), Year 2 years measures the patents still pending after two years (51.73%).

YEAR ¹	# of Patents	Distribution (%) ²	Cumulative #	Cumulative (%) ³	Inverse Cum. (%) ⁴
14	1201	0.05	2221055	99.85	0.15
15	847	0.04	2221902	99.89	0.11
16	577	0.03	2222479	99.91	0.09
17	404	0.02	2222883	99.93	0.07
18	323	0.01	2223206	99.95	0.05
19	181	0.01	2223387	99.95	0.05
20	177	0.01	2223564	99.96	0.04
21	110	0.00	2223674	99.97	0.03
22	114	0.01	2223788	99.97	0.03
23	65	0.00	2223853	99.98	0.02
24	85	0.00	2223938	99.98	0.02
25	76	0.00	2224014	99.98	0.02
26	62	0.00	2224076	99.99	0.01
27	43	0.00	2224119	99.99	0.01
28	43	0.00	2224162	99.99	0.01
29	32	0.00	2224194	99.99	0.01
30	38	0.00	2224232	99.99	0.01
31	36	0.00	2224268	99.99	0.01
32	19	0.00	2224287	100.00	0.00
33	21	0.00	2224308	100.00	0.00
34	13	0.00	2224321	100.00	0.00
35	19	0.00	2224340	100.00	0.00
36	12	0.00	2224352	100.00	0.00
37	12	0.00	2224364	100.00	0.00
38	7	0.00	2224371	100.00	0.00
39	2	0.00	2224373	100.00	0.00

YEAR ¹	# of Patents	Distribution (%) ²	Cumulative #	Cumulative (%) ³	Inverse Cum. (%) ⁴
40	6	0.00	2224379	100.00	0.00
41	3	0.00	2224382	100.00	0.00
42	2	0.00	2224384	100.00	0.00
43	1	0.00	2224385	100.00	0.00
44	1	0.00	2224386	100.00	0.00
45	1	0.00	2224387	100.00	0.00
48	1	0.00	2224388	100.00	0.00
52	1	0.00	2224389	100.00	0.00
64	1	0.00	2224391	100.00	0.00
68	1	0.00	2224392	100.00	0.00

