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I See Dead Patents: How Bugs in the Patent System Keep Expired Patents Alive

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Cover Page Footnote

* Associate at Susman Godfrey LLP; J.D. 2021, Harvard Law School; M. Eng., B.S. 2016 Massachusetts Institute of Technology. I want to express my sincere gratitude to Professor Mark A. Lemley, Abed R. Balbaky, Matthew E. Ladew, J. Jacob Marsh, and Benjamin L.W. Sobel for their invaluable comments that have considerably improved this article. The opinions expressed are those of the author and do not necessarily reflect the views of Susman Godfrey LLP or its clients.

I See Dead Patents: How Bugs in the Patent System Keep Expired Patents Alive

Dinis Cheian*

One of the most important days in the life of a patent is the day it dies.

The moment a patent dies, the patent owner loses her monopoly over her invention, ending the stream of income generated by that patent. Without an enforceable patent to protect the invention, the competitors and public can freely buy and sell copycat products that compete with the patent owner's. Consumers reap the rewards in the form of more options and lower prices.

Normally, those potential competitors must wait exactly twenty years from the date the patent application is filed with the United States Patent and Trademark Office ("Patent Office"). But if a patent owner is lucky, her competitors may wait even longer. The Patent Office may extend the life of a patent to compensate for certain delays in processing the application. Such an extension, known as a Patent Term Adjustment ("PTA"), is automatically calculated by computer software administered by the agency. But that software makes mistakes. Because the Patent Office will not double-check the computer's calculations—unless the patent owner asks it to—those mistakes are rarely discovered. These skewed incentives lead to excessive PTA that exclusively benefits the patent owners. In some industries, such as pharmaceuticals, every additional day of patent life can result in millions of dollars of profit for the patent owner—profits that they may not be entitled to by law—and can delay the collapse of the price of the patented drug. It is little surprise that fierce litigation ensues over even a single day of patent life.

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This Article exposes those software mistakes and their impact for the first time. In this Article, based on my original analysis of the Patent Office’s data, I identify two previously undiscovered software bugs, observed in more than 27,000 patents. I demonstrate how these bugs result in excessive PTA of, sometimes, 60–90 days. Because there are undoubtedly more than the two identified ways in which the software can err, I recommend that patent litigators start routinely double-checking the PTA in order to save their clients millions in patent infringement damages. Entities seeking approval of generic drugs should similarly take note of these bugs as they may impact the date on which they need to file their application with the Food & Drug Administration. I also propose regulatory changes that would allow the Patent Office to improve the software by crowdsourcing the identification of bugs. Finally, I recommend a statutory change that would minimize the number of patents with excessive PTA.

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INTRODUCTION

A patent’s expiration date is of paramount importance to the patent owner, the patent owner’s competitors, and the public. Patents

secure a patent owner's right to exclude others from benefiting from an invention¹ for the limited period of time of the patent's validity period. The validity period is also known as the "term" of the patent.² Effectively, the patent grants its owner a quasi-monopoly on the invention.³ If the invention is valuable, the patent generates significant revenue from, for example, direct sales of the invention or licensing fees paid by competitors.⁴ Once the patent expires, the patent owner's competitors and the public benefit from the invention unencumbered. Competitors are free to exploit the invention by selling cheaper alternatives⁵ without paying licensing fees or worrying about patent infringement suits.⁶ The public benefits from increased

¹ Specifically, a patent grants its owner "the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States, and, if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States, or importing into the United States, products made by that process, referring to the specification for the particulars thereof." 35 U.S.C. § 154(a)(1).

² Generally, patents are valid for a period "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 in the United States . . ." *Id.* § 154(a)(2). However, as I will discuss in this article, the life of the patent can "be extended" due to delays in processing the patent application. *Id.* § 154(b)(1)(A).

³ See, e.g., Peter M. Boyle et al., *Antitrust Law at the Federal Circuit: Red Light or Green Light at the IP-Antitrust Intersection?*, 69 ANTITRUST L.J. 739, 753 (2001) ("[A] patent owner may properly exercise monopoly power, by charging monopoly prices, in the markets for those products subject to its patent rights."); Note, *Limiting the Anticompetitive Prerogative of Patent Owners: Predatory Standards in Patent Licensing*, 92 YALE L.J. 831, 831 (1983).

⁴ See, e.g., R. Locke Bell, *Intellectual Property in an Emerging Commercial Spaceflight Market: Taking Advantage of Other Transaction Authority to Keep Pace with Changing Commercial Practices*, 43 PUB. CONT. L.J. 715, 720 (2014) ("After obtaining a patent, owners can then license the rights to use or sell their invention for royalties or some other consideration."); Bruce Greenhaus, *Patentability of Compounds Which Are Structurally Similar; What's "New"*, 3 HOFSTRA PROP. L.J. 211, 214 (1990).

⁵ See Jordan Paradise, *A Profile of Bio-Pharma Consolidation Activity*, 25 ANNALS HEALTH L. 34, 38 (2016).

⁶ See 35 U.S.C. § 271(a) ("[W]hoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.").

competition by way of reduced prices and broader availability of the patented product.⁷

Because a patent's expiration triggers these substantial realignments in the market, each additional day a patent is valid can be worth millions of dollars for the patent owner and delay the moment the product becomes more affordable for the public. For example, after the patent covering Prozac expired, the manufacturer's profits dropped, on average, \$5 million dollars *a day* for the next six months.⁸ In contrast, consumers benefitted from the drug's generic substitutes at discounts of 25% to 40%.⁹ Similar effects were observed for other drugs, with the drug prices falling 7% to 66%.¹⁰ Because the stakes are high, fierce litigation sometimes ensues over even a single additional day of patent validity.¹¹

Typically, a patent expires twenty years after the filing of a patent application,¹² but the patent's life can be extended to compensate for delays in processing the application.¹³ Once a patent applicant files a complete patent application, an examiner from the United States Patent and Trademark Office ("Patent Office") will review the application materials¹⁴ and either grant the application¹⁵ or issue a rejection.¹⁶ If a rejection is issued, the applicant will

⁷ See Gregory J. Glover, *The Influence of Market Exclusivity on Drug Availability and Medical Innovations*, 9 THE AAPS J. E312, E313 (2007).

⁸ Glynn S. Lunney, Jr., *On the Continuing Misuse of Event Studies: The Example of Bessen and Meurer*, 16 J. INTELL. PROP. L. 35, 45 (2008) (stating that the revenue the manufacturer derived from Prozac fell, on average, by \$5 million dollars a day after the patent covering the drug expired).

⁹ Robert F. Leibenluft & Michael Kades, *Antitrust Issues for Life Science Companies*, AM. HEALTH L. ASSOC., AHLA-PAPERS P04300616, at *2 (2006) (Westlaw).

¹⁰ See Gerard T. Vondeling et al., *The Impact of Patent Expiry on Drug Prices: A Systematic Literature Review*, 16 APPLIED HEALTH ECON. & HEALTH POL'Y 653, 657 (2018).

¹¹ See Complaint at 1, *ArQule, Inc. v. Kappos*, 793 F. Supp. 2d 214 (D.D.C. 2011) (No. 1:10-cv-01904-ESH) (seeking to increase the PTA of a patent covering a cancer treatment from 1,127 days to 1,128 days).

¹² 35 U.S.C. § 154(a)(2).

¹³ *Id.* § 154(b)(1)(A).

¹⁴ *Id.* § 131; MPEP § 702 (9th ed. Rev. 10-2019, June 2020).

¹⁵ MPEP §§ 1301, 1302.03 (9th ed. Rev. 10-2019, June 2020).

¹⁶ 37 C.F.R. § 1.104(c) (2002); see also 37 C.F.R. § 1.104(a)(2).

typically respond either by arguing that the examiner is mistaken or by amending the patent application to resolve the issues raised in the rejection.¹⁷ This back and forth will continue until either the application is granted¹⁸ or the applicant abandons her efforts to obtain a patent.¹⁹ Crucially, at every stage of the application process, both the examiner and the applicant must act by a mandatory deadline. If either party is late, the additional time it took to respond is added to that party's "delay."²⁰ Once the patent is issued, the applicant's total delay is subtracted from the examiner's total delay to determine the Patent Term Adjustment ("PTA"), which is the number of days the patent is valid beyond the default twenty years.²¹

The examiner's and the applicant's delays are calculated by a computer program administered by the Patent Office.²² The computer program analyzes the dates of the dozens of pieces of correspondence between the examiner and the applicant, and then the program applies a complex set of rules to determine the delay of each party.²³ It then subtracts the applicant's delay from the examiner's delay to determine the PTA.²⁴ Once the application is approved and the applicant pays the required fees, the Patent Office notifies her of its PTA determination.²⁵ Unless the applicant

¹⁷ 37 C.F.R. § 1.121 (2002); MPEP § 714 (9th ed. Rev. 10-2019, June 2020).

¹⁸ See MPEP §§ 1301, 1302.03 (9th ed. Rev. 10-2019, June 2020).

¹⁹ See 37 C.F.R. § 1.135(a) (1997).

²⁰ 35 U.S.C. § 154(b).

²¹ See *id.* § 154(b)(2)(C).

²² MPEP § 2734.03 (9th ed. Rev. 10-2019, June 2020) ("The Office makes the patent term adjustment determination indicated in the patent by a computer program that uses the information recorded in the Office's Patent Application Locating and Monitoring (PALM) system . . .").

²³ See *id.* ("The patent term adjustment provisions of 35 U.S.C. 154(b) are complex, with numerous types of communications exchanged between applicants and the Office during the patent application process.").

²⁴ 35 U.S.C. § 154(b)(2)(C).

²⁵ *Id.* § 154(b)(3)(B) ("[T]he Director shall (i) make a determination of the period of any patent term adjustment under this subsection, and shall transmit a notice of that determination no later than the date of issuance of the patent . . .").

challenges such determination within two months,²⁶ the Patent Office examiner will not review the computer's calculation.²⁷

But the computer makes mistakes. The rules for PTA computation are complex,²⁸ and the computer software is buggy. When a mistake results in the award of a smaller PTA, the mistake cannot be fixed unless the applicant challenges the PTA determination within the allotted time.²⁹ In that situation, applicants have an incentive to double-check the Patent Office and ensure that their patents are extended for as long as possible.

The incentives are more complicated when more PTA is awarded than is warranted. In theory, the applicant owes a duty of candor to the Patent Office³⁰ and may request that the agency correct the excessive PTA.³¹ In practice, such mistakes often go

²⁶ *Id.* § 154(b)(3)(B)(ii); 37 C.F.R. § 1.705(b) (2020) (“Any request for reconsideration of the patent term adjustment indicated on the patent must be by way of an application for patent term adjustment filed no later than two months from the date the patent was granted.”).

²⁷ *Cf.* MPEP § 2734 (“The Office makes the patent term adjustment determination indicated in the patent by a computer . . . except when an applicant requests reconsideration pursuant to 37 CFR [§] 1.705.”).

²⁸ MPEP § 2734 (highlighting the complexity of 35 U.S.C. § 154(b)'s patent term adjustment provisions).

²⁹ *See* 37 C.F.R. § 1.705(b) (2020).

³⁰ 37 C.F.R. § 42.11(a) (2021) (“Parties and individuals involved in the proceeding have a duty of candor and good faith to the Office during the course of a proceeding.”).

³¹ MPEP § 2733 (“If a registered practitioner receives a patent term adjustment indicated on the front of the patent that is longer than expected, the practitioner *may* disclose the error to the Office in a letter in compliance with the practitioner's duty of candor and good faith in practice before the Office.”) (emphasis added); *see* Treatment of Letters Stating That the USPTO's Patent Term Adjustment Determination Is Greater Than What the Applicant or Patentee Believes Is Appropriate, 75 Fed. Reg. 42079 (July 20, 2010) (“If the applicant or patentee wants the [Patent Office] to reconsider its patent term adjustment determination, the applicant or patentee must use the procedures set forth in [§] 37 CFR 1.705 for requesting reconsideration of a patent term adjustment determination, whether the [Patent Office's] patent term adjustment determination is greater than or less than the adjustment that the applicant or patentee believes to be appropriate. A patentee may also file a terminal disclaimer at any time disclaiming any period considered in excess of the appropriate patent term adjustment.”).

uncorrected, whether due to gamesmanship³² or negligence. Unlike the deflated PTA, the excessive PTA can be challenged years later in litigation, if detected.³³ Similar to Bruce Willis's character in the 1999 movie, *The Sixth Sense*, during the excess PTA, the patent appears alive to most casual observers but is, in fact, dead.³⁴

Based on my original empirical research, I identified two computer bugs resulting in excess PTA. Although it is possible, indeed likely, that there are more than two bugs plaguing Patent Office's software,³⁵ I will focus on these two bugs as they are observed in more than 27,000 patents and can lead to a substantial amount of unwarranted PTA, sometimes in the range of 60–90 days. Depending on the industry, these bugs can bestow millions in revenue on the patent owners³⁶ and force consumers to continue purchasing the patented product at inflated prices.³⁷

The first bug is that the computer sometime fails to detect some of the applicant's delayed replies, which leads to a smaller applicant delay and an excessive PTA.

The second such bug is that the dates of some correspondence between the applicant and the examiner will appear backdated in the records used by the software to determine delays. For example, if the software believes that an applicant's late reply to a rejection was received earlier than it was, the computer will fail to detect the applicant's delay. In turn, this will lead to a lower applicant delay and a higher, excessive PTA.

After explaining the problem and assessing its significance, I propose three solutions.³⁸ The first solution to this problem is for

³² See Neel Guha et al., *Vulnerabilities in Discovery Tech*, 35 HARV. J.L. & TECH. 581, 606 (stating that intentionality is “nearly impossible to discern” when it comes to software issues).

³³ 35 U.S.C. § 282(c)(2).

³⁴ Spoiler alert.

³⁵ See, e.g., *Idorsia Pharms. Ltd. v. Iancu*, 393 F. Supp. 3d 445, 454–56 (E.D. Va. 2019) (discussing the computer's failure to account for the scenario in which a filing date falls on a Saturday).

³⁶ See Lunney, *supra* note 8.

³⁷ See Vondeling, *supra* note 10.

³⁸ See *infra* Section III.

patent litigators to diligently double-check the computer's PTA calculations. Although there is no direct evidence, anecdotal accounts suggest that patent litigators tend to rely on the PTA calculation.³⁹ Patent prosecutors (who assist inventors in obtaining patents) must undergo a rigorous exam in order to represent clients at the Patent Office.⁴⁰ Part of this examination tests candidates on the complicated PTA rules.⁴¹ As we shall see, however, the computer's mistakes often evade even their trained eyes. Patent litigators, in contrast, need not be barred with the Patent Office as they typically⁴² represent their clients in federal court.⁴³ Consequently, they are less familiar with the intricacies of the PTA and are even more likely to take the computer-generated number for granted. An attentive patent litigator could invoke 35 U.S.C. § 282(c)(2) to challenge the excess PTA.⁴⁴ It is telling, however, that since its promulgation almost forty years ago,⁴⁵ that subsection has been invoked exactly zero times in litigation. In addition, practitioners representing entities seeking approval of generic drugs should similarly take note of these bugs as they may impact the date on which they need to file their application with the Food & Drug Administration (FDA).⁴⁶

³⁹ See *infra* note 154.

⁴⁰ *Becoming a Patent Practitioner*, U.S. PAT. & TRADEMARK OFF. (Dec. 8, 2021, 12:40 PM), <https://www.uspto.gov/learning-and-resources/patent-and-trademark-practitioners/becoming-patent-practitioner> [<https://perma.cc/ATA5-8AEB>].

⁴¹ See U.S. PAT. & TRADEMARK OFF., OFFICE OF ENROLLMENT & DISCIPLINE, GENERAL REQUIREMENTS BULLETIN FOR ADMISSION TO THE EXAMINATION FOR REGISTRATION TO PRACTICE IN PATENT CASES BEFORE THE UNITED STATES PATENT AND TRADEMARK OFFICE 19 (2021), <https://www.uspto.gov/sites/default/files/documents/OEDGRB.pdf> [<https://perma.cc/ZM9B-BJ8L>].

⁴² Patent litigators also represent clients at the Patent Office during *Inter Partes* Review proceedings, which require them to either be barred with the agency or be admitted *pro hac vice*. 37 C.F.R. § 42.10(c) (2021).

⁴³ See 28 U.S.C. § 1400(b).

⁴⁴ 35 U.S.C. § 282(c)(2) (“Invalidity of the extension of a patent term or any portion thereof under section 154(b) . . . because of the material failure . . . by the Director to comply with the requirements of such section shall be a defense in any action involving the infringement of a patent during the period of the extension of its term and shall be pleaded . . .”).

⁴⁵ Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, § 203, 98 Stat. 1603 (amending 35 U.S.C. § 282 to include the defense).

⁴⁶ 21 CFR 314.94(a)(12)(i)(A)(4); see also Paragraph IV Drug Product Applications: Generic Drug Patent Challenge Notifications, FDA (Apr. 20, 2021),

The second solution is regulatory and can be implemented by the Patent Office. To leverage the patent prosecutors' expertise, the Patent Office should revise its guidance to require prosecutors to file the requests to correct the excessive PTA when they become aware of the mistake, as part of their ethical obligations.⁴⁷ In addition, in the notice of issuance informing the applicant of the PTA her patent is entitled to, a warning should be included to remind patent applicants that errors can happen. To encourage such filings, the Patent Office should also waive the filing fee for requests asking for a lower PTA.⁴⁸ If upon inspection by the examiner the request is granted, that request should also be forwarded to the Patent Office's engineering team to adjust the computer code. This crowdsourcing of the identification of bugs coupled with a comprehensive review of the computer software will decrease the number of patents awarded excessive PTA going forward.

The third solution is a statutory one and, thus, requires Congress's intervention. Currently, the Patent Office must notify the applicant of the PTA she is entitled to "no later than the date of issuance of the patent."⁴⁹ By requiring that the agency do the work for the applicant, the statute decreases the need for the applicant to double-check the PTA calculations. Instead, Congress could amend that section to force the applicant to request PTA without the benefit of seeing the agency's work, just like a taxpayer must do with his tax refund. The Patent Office examiner could then compare the requested PTA with the computer's output, grant the request if the two match, and manually double-check the computer's work if they do not.

<https://www.fda.gov/drugs/abbreviated-new-drug-application-nda/paragraph-iv-drug-product-applications-generic-drug-patent-challenge-notifications>.

⁴⁷ See *supra* note 30; see also, Dinis Cheian, *Exploring Patent Practitioners' Duty to Correct Excess Patent Term Adjustment*, IP Watchdog (Oct. 20, 2022), <https://ipwatchdog.com/2022/10/20/exploring-patent-practitioners-duty-correct-excess-patent-term-adjustment/id=152232/> [<https://perma.cc/TV65-GVQZ>].

⁴⁸ 37 C.F.R. § 1.705(b)(1). Currently, the fee to file a request for reconsideration is \$210.00. 37 C.F.R. § 1.18(e) (2020).

⁴⁹ 35 U.S.C. § 154(b)(3)(B)(i).

This Article proceeds in three parts. Part I analyzes the significance of the PTA for patent owners and the basic rules of computing the adjustment. Part II lays out the two bugs discussed above and provides examples of real patents that were granted excess PTA. Finally, Part III walks the reader through potential solutions to the problem.

I. WHY PTA MATTERS AND HOW IT IS CALCULATED

The expiration date of a patent is of paramount importance because it triggers substantial market realignments. In exchange for disclosing her invention to the public, the inventor acquires the right to exclude others from practicing such invention.⁵⁰ Consequently, members of the public—including competitors—must either wait for the patent to expire or acquire the license from the patent owner,⁵¹ lest they risk being the target of an infringement lawsuit.⁵²

Although most patents do not generate significant financial returns for their owners, valuable patents can secure a stream of income from, for example, sales of the invention in a quasi-monopolistic market,⁵³ licensing the patent, or lawsuits.⁵⁴ The exact percent of patents that are monetized is unknown,⁵⁵ but estimates place the number at somewhere between 5% and 13%.⁵⁶ Out of the monetized patents, the generated income varies by industry.⁵⁷ In general, the

⁵⁰ 35 U.S.C. § 154(a)(1).

⁵¹ See Bell, *supra* note 4, at 720.

⁵² See 35 U.S.C. § 271.

⁵³ Boyle, *supra* note 3, at 753.

⁵⁴ Katherine E. White, *Preserving the Patent Process to Incentivize Innovation in Global Economy*, 13 SYRACUSE SCI. & TECH. L. REP. 1, 25 (2006).

⁵⁵ See Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1507 (2001) (“It is surprising that we don’t have a very good idea of how many patents are actually licensed for revenue.”).

⁵⁶ *Id.* at 1507 n.53 (2001) (“For what it’s worth, while several academics thought the 5% number [of licensed patents] was too low, some experienced patent prosecutors told [the author] it was too high.”); Colleen V. Chien, *Software Patents as a Currency, Not Tax, on Innovation*, 31 BERKELEY TECH. L.J. 1669, 1687–88 (2016) (reviewing studies with estimates for sold patents between 4.5% and 13.5%).

⁵⁷ Ted Hagelin, *Valuation of Patent Licenses*, 12 TEX. INTELL. PROP. L.J. 423, 424–25, 432 (2004).

value of a patent, even when monetized, is low.⁵⁸ One estimate provides that an average licensing agreement results in only \$13,000 in revenue, after patent fees are subtracted.⁵⁹ Part of the reason for low values is that, depending on the industry, a single product can be covered by tens of patents. That is the case in the electronics industry for devices such as smartphones.⁶⁰

However, many pharmaceutical drugs are protected by only one or just a handful of patents.⁶¹ Once these patents expire, generic drugs flood the market and can plummet revenues by as much as 90%.⁶² This can lead to huge losses for the patent holder but benefits the competitors and the consumers. Indeed, after the Prozac patents expired in August 2001 and generics flooded the market, the manufacturer's profits for that drug fell by an average of around \$142.67 million monthly for the next six months—almost \$5 million per day.⁶³ On the flip side, consumers could start purchasing generics at discounts of 25% to 40%.⁶⁴ Generics for other drugs similarly sell at discounted prices, ranging from 7% to 66%, following the

⁵⁸ Zach Kyle, *Commercializing Tech Research Has Yet to Fulfill Its Promise*, MAGIC VALLEY (June 27, 2015), http://magicvalley.com/news/local/commercializing-tech-research-has-yet-to-fulfill-itspromise/article_4e64c4f8-90d0-57f9-85fc-786e88da2a2e.html [https://perma.cc/5YNT-F8NF].

⁵⁹ Daniel E. Stern, *Stalled Patents: Re-Incentivizing Universities to Review Their Portfolios of Unlicensed Patents to Achieve the Bayh-Dole Act's Unfunded Mandate*, 45 HOFSTRA L. REV. 1017, 1046 (2017).

⁶⁰ For example, the iPhone is protected by more than 200 patents. Roy Weinstein et al., *Taming Complex Intellectual Property Compensation Problems*, *Micronomics* 3–5 (2011), available at https://static1.squarespace.com/static/61b53e492ea58d13b806ccb3/t/61bb823395fe3441afc2a503/1639678516406/Taming_Complex_IP_Compensation_Problems.pdf.

⁶¹ See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1590 (2003) (“In some industries, such as chemistry and pharmaceuticals, a single patent normally covers a single product.”); Lisa Larrimore Ouellette, *How Many Patents Does It Take to Make a Drug? Follow-On Pharmaceutical Patents and University Licensing*, 17 MICH. TELECOMM. & TECH. L. REV. 299, 300 (2010) (“In fact, most small-molecule drugs are protected by multiple patents. The average was nearly 3.5 patents per drug in 2005, with over five patents per drug for the best-selling pharmaceuticals; these numbers have increased over time.”).

⁶² Lunney, *supra* note 8, at 45.

⁶³ *Id.*

⁶⁴ Leibenluft & Kades, *supra* note 9.

expiration of the patent.⁶⁵ It is, thus, of little surprise that fierce litigation ensues over even a single day of patent life.⁶⁶ Accordingly, determining the exact date when the patent expires is crucial to the right-holder as well as to the public, especially in industries such as pharmaceuticals.

A. *Calculating Patent Delay: In Theory*

The first step in obtaining a patent is submitting a complete patent application.⁶⁷ Once it is submitted, a Patent Office examiner will review the filing and either grant the application⁶⁸ or issue a rejection, known as an office action.⁶⁹ One reason for a rejection is that the examiner discovered publicly available documents, known as prior art, that pre-date the application and discuss the invention.⁷⁰ In response to a rejection, the applicant will either argue that the examiner is incorrect or will amend the application to work around the prior art.⁷¹ This tango, known as patent prosecution,⁷² will continue until the applicant abandons her efforts or the examiner grants the application, issuing as a patent shortly thereafter.⁷³

Typically, a patent expires twenty years after the patent *application* is submitted to the Patent Office.⁷⁴ That is the minimum term. However, it is important to note that this default rule does not exactly define the life of the patent itself; as the full duration of the patent's life depends on how long the Patent Office takes to grant the application. Suppose Inventor A and Inventor B both submit

⁶⁵ Vondeling et al., *supra* note 10, tbl.2.

⁶⁶ See Complaint at 1, *ArQule, Inc. v. Kappos*, 793 F. Supp. 2d 214 (D.D.C. 2011) (No. 1:10-cv-01904-ESH) (seeking to increase the PTA of a patent covering a cancer treatment from 1,127 days to 1,128 days).

⁶⁷ 35 U.S.C. § 131; MPEP § 702.

⁶⁸ MPEP §§ 1301, 1302.03.

⁶⁹ 37 C.F.R. § 1.104(a)(2), (c).

⁷⁰ See 37 C.F.R. § 1.104(a)(1); MPEP § 901.

⁷¹ 37 C.F.R. § 1.121; MPEP § 714.

⁷² Prosecution, in this context, means pursuit. *Prosecution*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/prosecution> [https://perma.cc/SXA4-8UJU].

⁷³ See 37 C.F.R. § 1.135(a); MPEP §§ 1301, 1302.03.

⁷⁴ 35 U.S.C. § 154(a)(2).

their patent applications on January 1, 2020. If granted, both patents will expire on January 1, 2040 (twenty years after their filing date in 2020). Now assume that Inventor A's patent issues on January 1, 2022, but Inventor B's on January 1, 2024. Because a patent owner's rights become enforceable only once the patent issues,⁷⁵ Inventor A will enjoy her rights for 18 years, while Inventor B will benefit from his invention for only 16 years.

In practice, however, Inventor B may benefit for longer than 16 years because Congress directed the Patent Office to extend the life of the patents that experienced significant delays during prosecution. Such extension is known as a Patent Term Adjustment ("PTA")⁷⁶ and can range from zero⁷⁷ to thousands of days.⁷⁸ Three types of delays extend the life of the patent: identified by the Patent Office as *A* Delay, *B* Delay, and *C* Delay.⁷⁹ The first type, *A* Delay, generally captures delays incurred because the examiner was too slow to respond to the filing of a complete application or to an applicant's response.⁸⁰ For example, the first office action must be issued fourteen months after the filing date⁸¹ and subsequent office actions must follow within four months from the applicant's response.⁸² Thus, if the first office action was issued fifteen months after the filing date, the life of the patent will be extended by one month beyond the twenty years. By comparison, *B* Delay generally accrues if the patent was issued more than three years after filing.⁸³ Finally, *C* Delay accumulates during special proceedings, such as appeals.⁸⁴

⁷⁵ *But see id.* § 154(d) (providing for a narrow exception for the owner to enforce her rights before issuance of the patent).

⁷⁶ *Id.* § 154(b)(1).

⁷⁷ *See, e.g.*, U.S. Patent No. 6,609,413 (granting 0 days of PTA).

⁷⁸ *See, e.g.*, U.S. Patent No. 7,053,669 (granting 1,289 days of PTA).

⁷⁹ 35 U.S.C. § 154(b)(1)(A), (B), and (C), respectively; *see also* 37 C.F.R. § 1.703(a), (b), and (c), respectively.

⁸⁰ 35 U.S.C. § 154(b)(1)(A); 37 C.F.R. § 1.703(a).

⁸¹ 35 U.S.C. § 154(b)(1)(A)(i); 37 C.F.R. § 1.703(a)(1).

⁸² 35 U.S.C. § 154(b)(1)(A)(ii); 37 C.F.R. § 1.703(a)(2).

⁸³ 35 U.S.C. § 154(b)(1)(B); 37 C.F.R. § 1.703(b).

⁸⁴ 35 U.S.C. § 154(b)(1)(C); 37 C.F.R. § 1.703(c).

It is important to note that the statutory scheme mandates that overlapping delays will not be double counted.⁸⁵ Thus, for example, an office action that is mailed five months after a response filed three years into the pendency of the application generates both one month of *A* Delay and five months of *B* Delay. However, the applicant will only be awarded five months—not six—of PTA because the *A* Delay overlaps with the *B* Delay for one month. Furthermore, the sum of the non-overlapping delays will be diminished by the delays caused by the applicant.⁸⁶ Generally, applicants must respond to an office action within three months.⁸⁷ However, if for example, the applicant receives a two-month extension and responds at the five-month mark, those two months will be deducted from the PTA.



Perhaps walking through another example will prove helpful. As illustrated in the figure above, the following events occurred during the prosecution of our hypothetical patent application: (1) the application is filed on January 1, 2020, (2) the examiner issues an office action on February 1, 2023, (3) the applicant responds on June 1, 2023, and (4) the patent issues on July 1, 2023.

The PTA calculation is as follows:

$$PTA = A \text{ Delay} + B \text{ Delay} + C \text{ Delay} \\ - (\text{Delay Overlap} + \text{Applicant Delay})$$

⁸⁵ See 35 U.S.C. § 154(b)(2); 37 C.F.R. § 1.703(f).

⁸⁶ 35 U.S.C. § 154(b)(2)(C); 37 C.F.R. § 1.704(a).

⁸⁷ See 35 U.S.C. § 154(b)(2)(C)(ii); 37 C.F.R. § 1.704(b). However, for a fee, the applicant can take up to six months to respond without the Patent Office deeming the application abandoned. MPEP § 7.98.01.

Since there is no C Delay in this case, the formula becomes:

$$PTA = A \text{ Delay} + B \text{ Delay} \\ - (A \& B \text{ Delay Overlap} + \text{Applicant Delay})$$

Recall that *A* Delay accumulates when the Patent Office responds too late to an event.⁸⁸ In this case, it had fourteen months⁸⁹ from the moment the application was filed on January 1, 2020 (or until March 1, 2021), to either grant the application or issue an office action. It failed to do so, as the office action was issued on February 1, 2023—twenty-three months or 702 days late. This number is our *A* Delay. Next, *B* Delay is the time the Patent Office took to issue the patent in addition to the three years (expiring on January 1, 2023). In this case, the patent was issued on July 1, 2023, which is six months or 181 days after the three-year mark.

However, *A* Delay and *B* Delay overlap for one month from January 1, 2023 to February 1, 2023. To avoid double counting the delays, such overlap is subtracted from the PTA.⁹⁰ In this case, the overlap is 31 days. Finally, the applicant herself was responsible for some of the *B* Delay. She had three months to timely respond to the office action of February 1, 2023.⁹¹ She failed to do so and instead responded on June 1, 2023. Because the applicant cannot be rewarded for her own delays, the 31 days between May 1 and June 1 must be subtracted from the PTA. Thus, the final PTA calculation is as follows:

$$702 \text{ days} + 181 \text{ days} - (31 \text{ days} + 31 \text{ days}) = 821 \text{ days}$$

The patent will, therefore, expire twenty years and 821 days after its filing on January 1, 2020, which is April 1, 2042. In the issue notification, the applicant will be informed of the PTA she is awarded⁹² and will have two months to challenge the PTA

⁸⁸ 35 U.S.C. § 154(b)(1)(A); 37 C.F.R. § 1.703(a).

⁸⁹ See 35 U.S.C. § 154(b)(1)(A)(i); 37 C.F.R. § 1.703(a)(1).

⁹⁰ 35 U.S.C. § 154(b)(2); 37 C.F.R. § 1.703(f).

⁹¹ See 35 U.S.C. § 154(b)(2)(C)(ii); 37 C.F.R. § 1.704(b).

⁹² 35 U.S.C. § 154(b)(3)(B).

calculation.⁹³ The PTA will then be printed on the face of the patent to notify the public of the expiration date.⁹⁴

B. Calculating Patent Delay: In Practice

To keep up with the high number of patents issued each day and the complexities of the calculations, the Patent Office uses a computer program to calculate the PTA.⁹⁵ The example above is a drastic simplification of the many possible events, and of the complex PTA rules triggered by such events, that an application typically undergoes. Because the Patent Office, by statute, must inform the applicant of the PTA she is entitled to, it uses a computer program to tackle the workload.⁹⁶ The program uses the information in the Patent Office's Patent Application Locating and Monitoring ("PALM") system—not originally intended to assist in PTA computation—which logs and categorizes different events occurring during the review of the application.⁹⁷ For example, in the illustration above, the PALM system would record that the application was filed on January 1, 2020, that the office action was issued on February 1, 2023, that the response was filed on June 1, 2023, and that the patent was issued on July 1, 2023. Much like we did in the example above, the computer program would then apply a set of rules to determine the PTA.⁹⁸

The Patent Office makes publicly available the information the computer uses to derive the PTA.⁹⁹ All that happens during the pendency of the patent application can be seen on the Patent Center website.¹⁰⁰ The page for each application has many tabs but the Patent Term Adjustment tab is of particular importance here. Each

⁹³ *Id.* § 154(b)(3)(B)(ii); 37 C.F.R. § 1.705(b).

⁹⁴ *See, e.g.*, U.S. Patent No. 8,067,555 ("Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 701 days.").

⁹⁵ *See* MPEP § 2734.

⁹⁶ *Id.*

⁹⁷ *See id.* ("The PALM system was not originally designed for the purpose of calculating patent term adjustment as provided in 35 U.S.C. 154(b).").

⁹⁸ *See id.*

⁹⁹ *Patent Center*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov> [<https://perma.cc/X3ZP-TTP4>] (last visited Sep. 22, 2022).

¹⁰⁰ *See id.*

event during prosecution generates one or more entries in that tab. Along with the sequential number (“Number”) and a description of the event (“Contents Description”), the event has an associated date (“Date”), a Patent Office delay field (“PTO (Days)”), an applicant delay field (“APPL (Days)”), and the number of the event that starts the delay clock (“Start”).¹⁰¹

¹⁰¹ See, e.g., *Patent Center, 13/480,160|BB1005CIP: Powered Lower Extremity Orthotic and Method of Operation*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/13480160/patentTermAdjustment> [perma.cc/3EF2-ZSZQ] (last visited Sept. 17, 2022).

Patent Term Adjustment History

Number	Date	Contents Description	PTO (Days)	APPL (Days)	Start
83.5	05/31/2016	PTA 36 Months	373	0	0.5
83	05/31/2016	Patent Issue Date Used in PTA Calculation		0	0
82	04/29/2016	Export to Final Data Capture		0	0
81	04/28/2016	Dispatch to FDC		0	0
80	04/28/2016	Application Is Considered Ready for Issue		0	0
79	04/27/2016	Issue Fee Payment Verified		0	0
78	04/27/2016	Issue Fee Payment Received		0	0
77	02/11/2016	Finished Initial Data Capture		0	0
76	02/01/2016	Export to Initial Data Capture		0	0
75	02/01/2016	Electronic Review		0	0
74	02/01/2016	Email Notification		0	0
73	02/01/2016	Mail Notice of Allowance	98	0	62
72	01/28/2016	Office Action Review		0	0
71	01/28/2016	Issue Revision Completed		0	0
70	01/28/2016	Document Verification		0	0
69	01/28/2016	Notice of Allowance Data Verification Completed		0	0
68	01/25/2016	Allowability Notice		0	0
63	01/06/2016	Date Forwarded to Examiner		0	0
62	06/26/2015	Response after Non-Final Action		0	0
* * *					
45	09/24/2014	Mail Non-Final Rejection	427	0	0.5
* * *					
14	02/14/2013	Additional Application Filing Fees		161	6
13	02/14/2013	A statement by one or more inventors satisfying the requirement under 35 USC 115, Oath of the Applicant		0	0
12	02/15/2013	Mail-Petition Decision - Granted		0	0
11	02/15/2013	Petition Decision - Granted		0	0
10	02/14/2013	Petition Entered		0	0
9	12/14/2012	Mail-Petition Decision - Dismissed		0	0
8	12/14/2012	Petition Decision - Dismissed		0	0
7	10/09/2012	Petition Entered		0	0
6	06/06/2012	Notice Mailed--Application Incomplete--Filing Date Assigned		0	0
5	06/06/2012	Filing Receipt		0	0
4	05/26/2012	Cleared by CIPE CSR		0	0
3	05/25/2012	Information Disclosure Statement (IDS) Filed		0	0
2	05/24/2012	IPW Scan & PACR Auto Security Review		0	0
1	05/24/2012	Initial Exam Team nn		0	0
0.5	05/24/2012	Filing date		0	0

As an example, let us consider the PTA tab for application number 13/480,160.¹⁰² The application was filed on May 24, 2012, and the filing event was assigned sequential number 0.5.¹⁰³ On June 6, 2012, the examiner notified the applicant that the application was incomplete due to a missing oath and asked him to pay a surcharge

¹⁰² *Id.*

¹⁰³ *See id.* (viewing 10 per page hereinafter; select tab 8 at the bottom of the page).

for filing the oath late (#6, Notice to File Missing Parts of Nonprovisional Application).¹⁰⁴ The applicant filed the oath (#13)¹⁰⁵ and paid the fee (#14)¹⁰⁶ on February 14, 2013—161 days after the three-month deadline on September 6, 2012.¹⁰⁷ That delay was noted in the “APPL (Days)” column. The “Start” column helpfully informs the public of the event that started the clock, in this case event #6, the notification on June 6, 2012.¹⁰⁸

In turn, the examiner was late to issue the first rejection on September 24, 2014 (#45).¹⁰⁹ He did so 427 days past the fourteen-month deadline after the filing (#0.5).¹¹⁰ Finally, the examiner was late again, this time by 98 days, to issue the notice of allowance (#73), informing the applicant that the application will issue once the issuance fee is paid.¹¹¹ The event starting the examiner’s clock was the applicant’s response to an office action (labeled as a “non-final action”) on June 26, 2015 (#62).¹¹² The examiner had four months to respond with either a notice of allowance or another office action. The application then issued as a patent on May 31, 2016 (#83).¹¹³ Event #83.5 “PTA 36 months” is an artificial event used to calculate *B* Delay from the filing date (#0.5).¹¹⁴ In this case it is 373

¹⁰⁴ *See id.* (select tab 7 at the bottom of the page).

¹⁰⁵ *See id.* (select tab 6 at the bottom of the page).

¹⁰⁶ *See id.*

¹⁰⁷ *See* MPEP § 2732 (“The three-month period in 37 CFR 1.704(b) applies to the Office notices and letters issued as part of the pre-examination processing of an application (except a Notice of Omitted Items in a Nonprovisional Application as discussed above). These notices include: (1) a Notice of Incomplete Nonprovisional Application . . .”).

¹⁰⁸ *See Patent Center, 13/480,160, supra* note 101 (select tab 6 at the bottom of the page).

¹⁰⁹ *See id.* (select tab 3 at the bottom of the page).

¹¹⁰ *See id.* (select tab 1 at the bottom of the page).

¹¹¹ *See id.* (select tab 2 at the bottom of the page).

¹¹² *See id.*

¹¹³ *See id.* (select tab 1 at the bottom of the page).

¹¹⁴ *See id.*

days or just a little over a year from the 36-month deadline on May 24, 2015.¹¹⁵

A Delays	B Delays	C Delays	Overlapping Days	Non-Overlapping USPTO Delays	PTO Manual Adjustments	Applicant Delays	Total patent Term Adjustments
525 days	373 days	0	98 days	800 days	0	161 days	↑ 639 days

At the top of the PTA tab, a summary of all information relevant to the calculation of PTA is provided. This tab includes, the total of *A* Delays, *B* Delays, *C* Delays, the overlap of the delays, the non-overlapping delays, manual adjustments, applicant delays, and, finally, the awarded PTA.¹¹⁶ In the figure below you can see that the Patent Office *A* Delay was 525 days (427 days (#45) + 98 days (#73)), *B* Delay was 373 days, and there was no *C* Delay.¹¹⁷ The overlap between the *A* and *B* Delay was 98 days because the delay incurred due to the late notice of allowance (#73)¹¹⁸ occurred entirely after the three-year mark on May 24, 2015. The non-overlapping Patent Office delay was, thus, 800 days (525 days + 373 days – 98 days).¹¹⁹ The applicant delay was 161 days (#14).¹²⁰ In total, the PTA adjustment summed up to 639 days (800 days – 161 days).¹²¹ Note that the PTO manual adjustment was 0; this field remains 0 unless the Patent Office examiner, following a request for reconsideration, manually reviews the computer’s calculations and determines that an adjustment was warranted.¹²²

¹¹⁵ *See id.*

¹¹⁶ *See id.*

¹¹⁷ *See id.*

¹¹⁸ *See id.* (select tab 2 at the bottom of the page).

¹¹⁹ *Id.* (under the “Patent Term Adjustment” summary banner).

¹²⁰ *Id.* (select tab 6 at the bottom of the page).

¹²¹ *Id.* (under the “Patent Term Adjustment” summary banner).

¹²² *Id.*; see also *Explanation of Patent Term Adjustment Calculation*, U.S. PAT. & TRADEMARK OFF. (Apr. 24, 2014, 2:25 PM), <https://www.uspto.gov/patents/apply/checking-application-status/pair-announcements/explanation-patent-term> [perma.cc/DLF7-RYJX].

Now that we have discussed the basic PTA rules and how the Patent Office's computer software applies such rules to the dates stored in the PALM system, we can discuss the bugs in the system.

II. THE TWO BUGS

Although there are several types of errors, this Part focuses on two bugs—each identified by me in thousands of granted patents—that may inflate the PTA term by months. Given that each day of patent validity can earn the patent owner millions of dollars,¹²³ these errors are substantial. Although the Patent Office acknowledges that the software is not perfect due to the complexity of the PTA rules,¹²⁴ the two issues discussed in this part appear to be coding issues and not a failure to properly apply an obscure rule to a corner case. The first bug appears to be an error in the computer program computing the PTA based on the PALM data, the second an issue with the PALM data itself.

A. *The First Bug: Forgiven Delays*

The first bug in the PTA calculation software is that sometimes the computer fails to penalize applicants for late replies.

Number	Date	Contents Description	PTO (Days)	APPL (Days)	Start
75	06/06/2013	Response after Non-Final Action	0	0	
74	06/06/2013	Request for Extension of Time - Granted	0	0	
73	06/06/2013	Electronic Information Disclosure Statement	0	0	
72	06/06/2013	Information Disclosure Statement (IDS) Filed	0	0	
71	12/12/2012	Electronic Review	0	0	
70	12/12/2012	Email Notification	0	0	
69	12/12/2012	Mail Non-Final Rejection	0	0	

¹²³ See Lunney, *supra* note 8.

¹²⁴ See MPEP § 2734.

Consider Application Number 12/835,086 awarded 557 days in PTA.¹²⁵ On December 12, 2012, the examiner issued a rejection (#69), giving the applicant three months to respond.¹²⁶ The applicant did not respond within the allotted time; instead, she filed her response on June 6, 2013 (#75), along with a request for extension of time (#74).¹²⁷ This tardiness should have resulted in an applicant delay of 86 days.¹²⁸ But no such delay was logged by the computer program, as indicated by the “0” in the “APPL (Days)” column.¹²⁹

Patent Term Adjustment

A Delays	B Delays	C Delays	Overlapping Days	Non-Overlapping USPTO Delays	PTO Manual Adjustments	Applicant Delays	Total patentTerm Adjustments
286 days	367 days	0	0	653 days	0	96 days	↑ 557 days

Patent Term Adjustment History

Number	Date	Contents Description	PTO (Days)	APPL (Days)	Start
127	05/21/2014	Issue Fee Payment Received	0	0	
126	05/02/2014	Finished Initial Data Capture	0	0	
125	04/10/2014	Email Notification	0	0	
124	04/10/2014	Printer Rush- No mailing	0	0	
123	04/10/2014	Mail Miscellaneous Communication to Applicant	18	118	
122	04/07/2014	Office Action Review	0	0	
121	04/05/2014	Miscellaneous Communication to Applicant - No Action Count	0	0	
120	04/04/2014	Pub's Case Remand to TC	0	0	
119	03/24/2014	PARALEGAL OR ELECTRONIC TERMINAL DISCLAIMER APPROVED	0	0	
118	03/24/2014	Terminal Disclaimer Filed	0	0	
...					
91	02/13/2014	Notice of Appeal Filed	78	87	
90	02/13/2014	Request for Extension of Time - Granted	0	0	
89	08/27/2013	Electronic Review	0	0	
88	08/27/2013	Email Notification	0	0	
87	08/27/2013	Mail Final Rejection (PTCL - 326)	0	0	

Instead, the only delays that were accounted for in the 96 days in the “Applicant Delays” field were a late notice of appeal (#91,

¹²⁵ Patent Center, 12/835,086, Patent Term Adjustment History, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/12835086/patentTermAdjustment> [perma.cc/M2AC-CECN].

¹²⁶ *Id.* (select tab 7 at the bottom of the page).

¹²⁷ *Id.*

¹²⁸ See 35 U.S.C. § 154(b)(2)(C)(ii); 37 C.F.R. § 1.704(b).

¹²⁹ Patent Center, 12/835,086, *supra* note 125 (under the “Patent Term Adjustment” summary banner).

triggered by #87)¹³⁰ and a late communication (#123, triggered by #118).¹³¹ Thus, the PTA is inflated by 86 days.

My comprehensive review of all the issued patents as of 2019 uncovered almost 25,000 instances in which an extension resulted in no delay. To promote empirical research of the process of obtaining a patent, the Patent Office makes available complete datasets for each patent ever granted, including the logs of the PTA events.¹³² Using the 2019 dataset, I ran a code that first selected only the patents that had a PTA greater than zero. This step helped ensure that the undetected applicant delay could impact the final extension; the PTA cannot be negative. I also eliminated the patents that had a non-zero PTO manual adjustments field since a nonzero adjustment means that the examiner manually reviewed the computer's calculations, and likely caught the mistake.¹³³ Then the code scanned each of the selected patents' PTA logs and identified the instances in which the applicant requested an extension but the total applicant

¹³⁰ *Id.* (select tab 5 at the bottom of the page).

¹³¹ *Id.* (select tab 2 at the bottom of the page).

¹³² See generally Stuart Graham et al., *The USPTO Patent Examination Research Dataset: A Window on the Process of Patent Examination* (U.S. PAT. & TRADEMARK OFF., Econ. Working Paper No. 2015-4, 2015), <https://ssrn.com/abstract=2702637> [<https://perma.cc/PV4T-4BGQ>]; *Patent Examination Research Dataset (PatEx)*, U.S. PAT. & TRADEMARK OFF. (Sep. 8, 2022, 2:18 PM), <https://www.uspto.gov/ip-policy/economic-research/research-datasets/patent-examination-research-dataset-public-pair> [perma.cc/XM58-2QZV].

¹³³ *Patent Center*, 13/480,160, *supra* note 101 (under the "Patent Term Adjustment" summary banner).

delay was zero. 24,914 such patents were identified.¹³⁴ Out of those, 121 have been litigated¹³⁵ as of 2016.¹³⁶

B. The Second Bug: Backdated Events

The second bug is that some events appear backdated in the PALM system, preventing the computer from detecting and properly computing applicant delays.

Patent Term Adjustment History					
Number	Date	Contents Description	PTO (Days)	APPL (Days)	Start
50	02/06/2019	Amendment Submitted/Entered with Filing of CRA/RCE	0	0	
49	02/06/2018	Request for Continued Examination (RCE)	0	0	
48	02/07/2019	Disposal for a RCE / CRA / R129	0	0	
47	02/06/2018	Request for Extension of Time - Granted	0	0	
46	02/06/2019	Workflow - Request for RCE - Begin	0	0	
45	09/07/2018	Electronic Review	0	0	
44	09/07/2018	Email Notification	0	0	
43	09/07/2018	Mail Final Rejection (PTOL - 326)	0	0	
42	09/04/2018	Office Action Review	0	0	
41	09/03/2018	Final Rejection	0	0	

¹³⁴ See, e.g., *Patent Center, 13/357,856, Patent Term Adjustment*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/13357856/patentTermAdjustment> [perma.cc/84ZB-XS7T] (select tabs 3 and 4 at the bottom of the page) (events #27–33 should have caused an applicant delay of 78 days); *Patent Center, 10/980,097, Patent Term Adjustment*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/10980097/patentTermAdjustment> [perma.cc/VM47-NZSY] (select tab 3 at the bottom of the page) (events #34 and #36 should have caused applicant delay of 61 days).

¹³⁵ See, e.g., *Patent Center, 13/325,754, Report on the Filing or Determination of an Action Regarding a Patent or Trademark*, (Jan. 5, 2015 and Apr. 7, 2015), U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/13325754/ifw/docs> [perma.cc/ND7L-UGRD]. During prosecution of Application No. 13/325,754, the applicant requested an extension on May 21, 2014, (#49) to respond to a rejection (#43) mailed on December 30, 2013, but the delay was never accounted for by the software. *Patent Center, 13/325,754, Patent Term Adjustment*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/13325754/patentTermAdjustment> [perma.cc/B7TZ-PJYF].

¹³⁶ *Patent Litigation Docket Reports Data*, U.S. PAT. & TRADEMARK OFF. (Mar. 16, 2022, 5:48 PM), <https://www.uspto.gov/ip-policy/economic-research/research-datasets/patent-litigation-docket-reports-data> [perma.cc/4TFH-42QW].

Take for example, application number 15/179,897, issued as a patent on October 29, 2019 and awarded 115 days of PTA.¹³⁷ The examiner mailed a rejection on September 7, 2018 (#43).¹³⁸ As discussed above and as explained in the office action, the applicant had three months to respond—until December 7, 2018.¹³⁹ The applicant was late, and did not file a response amending the application, until February 6, 2019 (#50).¹⁴⁰ Correctly realizing that his response was past the three-month deadline, he filed a request for extension of time (#47).¹⁴¹ This late response should have resulted in 61 days of delay.¹⁴² However, the date of the request appears backdated in the system: instead of February 6, 2019, it is February 6, 2018, likely tricking the software into thinking that the response was filed before the three-month mark.¹⁴³

We can verify that the request for extension was indeed filed in 2019 in other tabs, such as the “Documents & transaction history” tab that records events independently from the PALM system.¹⁴⁴ Both the dates in that tab and the date in the filed extension request document itself are February 6, 2019.¹⁴⁵

¹³⁷ *Patent Center, 15/179,897, Patent Term Adjustment*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/15179897/patentTermAdjustment> [<https://perma.cc/MV33-U9GQ>].

¹³⁸ *Id.* (select tab 5 at the bottom of the page).

¹³⁹ *See* 35 U.S.C. § 154(b)(2)(C)(ii); 37 C.F.R. § 1.704(b).

¹⁴⁰ *Patent Center, 15/179,897, supra* note 137 (select tab 4 at the bottom of the page).

¹⁴¹ *Id.* (select tab 5 from the bottom of the page).

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Patent Center, 15/179,897, Documents & transaction history*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/15179897/ifw/docs> [<https://perma.cc/P9PS-ABPQ>].

¹⁴⁵ *Id.*

Patent Term Adjustment							
A Delays	B Delays	C Delays	Overlapping Days	Non-Overlapping USPTO Delays	PTO Manual Adjustments	Applicant Delays	Total patent Term Adjustments
202 days	0	0	0	202 days	0	87 days	↑ 115 days

Patent Term Adjustment History					
Number	Date	Contents Description	PTO (Days)	APPL (Days)	Start
89	03/08/2019	Request for Continued Examination (RCE)	0	0	
68	06/05/2019	Disposal for a RCE / CRA / R129	0	0	
87	06/03/2019	Information Disclosure Statement (IDS) Filed	87	69	

We can also verify that the 61 days in delay were unaccounted for by reviewing the top panel of the PTA tab.¹⁴⁶ The only applicant delay that was registered is an 87-day delay incurred when the applicant filed a late disclosure statement (triggered by #69).¹⁴⁷ The result in this particular case is that the PTA is inflated by 61 days.

I uncovered more than 2,600 instances in which the applicant's reply was backdated. Using the same dataset as for the first bug,¹⁴⁸ I first selected the patents with a PTA greater than zero and a zero PTO manual adjustment and then all the patents in which a reply to an office action was backdated. This process yielded 2,618 patents.¹⁴⁹ Out of those, 21 have been litigated¹⁵⁰ as of 2016.¹⁵¹

¹⁴⁶ *Patent Center*, 15/179,897, *supra* note 137.

¹⁴⁷ *Id.* (select tab 3 from the bottom of the page).

¹⁴⁸ *Patent Litigation Docket Reports Data*, *supra* note 136.

¹⁴⁹ *See, e.g., Patent Center*, 15/407,332, *Patent Term Adjustment*,

U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/15407332/patentTermAdjustment> [<https://perma.cc/84XT-3NGC>] (select tab 3 from the bottom of the page) (events #51 and #53 are backdated, unaccounted delay is 54 days); *Patent Center*, 15/189,865, *Patent Term Adjustment*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/15189865/patentTermAdjustment> [<https://perma.cc/3R37-ULB2>] (select tabs 3 and 4 at the bottom of the page) (events #49 and #50 are backdated, unaccounted delay is 31 days).

¹⁵⁰ *See, e.g., Patent Center*, 10/151,220, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/10151220> [<https://perma.cc/Q4FZ-LMA4>] (events #11 and #12 are backdated, unaccounted delay is 61 days); *see also* Mike Seymour, *Panavision Sues Canon and Others*, *FX GUIDE* (Jan. 12, 2010), <https://www.fxguide.com/quicktakes/panavision-sues-canon-and-other/> [<https://perma.cc/987Z-UPL8>].

¹⁵¹ *Explanation of Patent Term Adjustment Calculation*, *supra* note 122.

Although the thousands of patents identified above represent only a small percent of the millions of issued patents¹⁵² and although it is possible that some patents whose PTA is not excessive were included, the two bugs are certainly not the only ones. Take for example application No. 08/631,331, in which the computer software erred by a stunning 1,571 days,¹⁵³ mostly due to improperly classifying a filing as an office action and incorrectly determining the event that started the delay clock.¹⁵⁴ Thankfully, the applicant caught the mistake and requested the downward adjustment of the PTA.¹⁵⁵

The PTA computation software, therefore, is far from perfect. And although the Patent Office cautions practitioners that some errors are to be expected due to the complexity of PTA rules,¹⁵⁶ the bugs discussed in this Part involve the simplest of such rules—that the applicant has three months to respond to an office action before incurring delays.¹⁵⁷

III. THREE SOLUTIONS

Having identified the problem and assessed its significance, I now propose three potential solutions for minimizing the effects of the excess PTA and for improving the Patent Office’s software.

¹⁵² *PTMT Products and Services Brochure*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/web/offices/ac/ido/oeip/taf/brochure.htm#:~:text=private%20sector%20organizations,-,Patents%20and%20Patent%20Activity,granted%20on%20July%2031%2C%201790> [https://perma.cc/UF3Q-2Y93] (“Over 7.8 million United States patents, including over 7.2 million utility patents (‘patents for inventions’) have issued since the first was granted on July 31, 1790.”).

¹⁵³ *Patent Center, 08/631,331, Patent Term Adjustment*, U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/08631331/patentTermAdjustment> [https://perma.cc/X3YQ-VW46].

¹⁵⁴ *Patent Center, 08/631,331, Documents & transaction history, Letter Regarding Patent Term Adjustment* (Aug. 24, 2006), U.S. PAT. & TRADEMARK OFF., <https://patentcenter.uspto.gov/applications/08631331/ifw/docs> [https://perma.cc/C783-WCY2].

¹⁵⁵ *Id. at Request for Review of Patent Adjustment Determination* (June 30, 2006).

¹⁵⁶ *See generally* MPEP § 2734.

¹⁵⁷ 35 U.S.C. § 154(b)(2)(C)(ii); 37 C.F.R. § 1.704(b).

A. *The Private Solution*

The first solution is for patent practitioners—especially litigators—to routinely double-check the PTA. Patent prosecutors, who represent patent applicants at the Patent Office, must be barred with the agency.¹⁵⁸ Although one does not need a law degree to be barred, aspiring patent prosecutors do need to pass a rigorous, six-hour patent bar exam, colloquially referred to as the “patent bar.”¹⁵⁹ Such exam covers the PTA rules.¹⁶⁰ Nevertheless, as we have seen, PTA mistakes often evade the watchful eye of the patent prosecutor.¹⁶¹ If the PTA goes uncorrected in the two months allotted for the request for reconsideration,¹⁶² it is unlikely to ever be fixed because unlike patent prosecutors, patent litigators and transactional patent attorneys are often not admitted with the Patent Office.¹⁶³ These actors are less likely to venture into the records of the patent history and to spot the inflated PTA.¹⁶⁴

If the error is detected during patent litigation, defendants are not without options. “Invalidity of the extension of a patent term . . . because of the material failure . . . by the Director [of the Patent Office] to comply with the requirements of [the patent statutes] shall be a defense in any action involving the infringement of a patent during the period of the extension of its term.”¹⁶⁵ Thus, defendants in patent infringement lawsuits can raise the erroneously granted PTA as a defense to avoid paying damages during the excess period.

¹⁵⁸ See *Becoming a Patent Practitioner*, *supra* note 40.

¹⁵⁹ See U.S. PAT. & TRADEMARK OFF., *supra* note 41 at 19 (“A total of six hours is permitted for completion of the examination.”).

¹⁶⁰ *Id.*

¹⁶¹ Note that although “the patentee or the appointed registered practitioner may disclose the alleged error to the Office in a letter in compliance with the practitioner’s duty of candor and good faith,” the Patent Office does not require such a filing. MPEP § 2733. *But see*, Cheian, *supra* note 47.

¹⁶² See 35 U.S.C. § 154(b)(3)(B)(ii); *see also* 37 C.F.R. § 1.705(b).

¹⁶³ See David L. Schwartz, *The Rise of Contingent Fee Representation in Patent Litigation*, 64 ALA. L. REV. 335, 351–52, 354 (2012).

¹⁶⁴ For example, U.S. Patent No. 8,789,986 (which matured from App. No. 13/325,754) was litigated twice, but the parties did not note that the PTA was excessive, as is evident from the absence of such allegations in the lawsuits or the Patent Office’s record. *See Patent Center, 13/325,754*, *supra* note 135.

¹⁶⁵ 35 U.S.C. § 282(c)(2).

Notably absent, however, is a single case in which such a defense was raised in the almost forty years since that subsection was enacted.¹⁶⁶ This lacuna can be interpreted to support the suspicion that patent litigators rarely check the logs to verify the PTA. Other explanations could be that the defense is raised in confidential communications between the parties or that plaintiffs do not assert patents with excessive PTA are feasible.

Another group of patent practitioners that urgently need to take heed of these bugs are those assisting pharmaceutical companies in registering generic drugs with the FDA.¹⁶⁷ At the expiration of a patent covering a drug, entities that would like to sell generic version of the drug need to register the generic with the FDA.¹⁶⁸ The entity that files first for such a registration “has the exclusive right to market the generic drug for 180 days”¹⁶⁹ As part of the filing, the entity must certify that the patent covering the original drug is invalid.¹⁷⁰ Thus, lawyers on the lookout for PTA errors may discover that certain patents expire, and are thus invalid, earlier than it appears if one blindly relies on the Patent Office’s calculations. This realization would allow the lawyers to file the generic registration earlier, thus securing the exclusive marketing right for their clients.¹⁷¹

B. The Regulatory Solution

A second solution is a regulatory fix. First, the Patent Office should perform an audit of the PTA computing software, identify issues, and patch them. Realistically, however, the Patent Office will not be able to detect all the errors because PTA rules are complex and software bugs can be hard to uncover. The solution would be to

¹⁶⁶ Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, § 203, 98 Stat. 1585, 1603 (amending 35 U.S.C. § 282 to include the defense).

¹⁶⁷ 21 C.F.R. § 314.94(a)(12)(i)(A)(4).

¹⁶⁸ *Id.*

¹⁶⁹ Paragraph IV Drug Product Applications: Generic Drug Patent Challenge Notifications, U.S. FOOD & DRUG ADMIN. (Apr. 20, 2021), <https://www.fda.gov/drugs/abbreviated-new-drug-application-anda/paragraph-iv-drug-product-applications-generic-drug-patent-challenge-notifications> [<https://perma.cc/R5WX-VJG7>].

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

crowdsource this issue by closely reviewing the requests for reconsideration filed by patent applicants. Every granted request that results in a decreased PTA, and perhaps select request that result in an increased PTA, should be forwarded to the software team for further review.

To speed-up the patching of bugs, the Patent Office should mandate that, as part of the prosecutors' duty of candor, they submit requests to decrease the PTA when they become aware of the mistake. Prosecutors, and everyone associated with the filing and prosecution of the application, owe the Patent Office a duty of candor.¹⁷² Failure to adhere to this duty can lead to sanctions¹⁷³ and to the invalidation of the patent.¹⁷⁴ Currently, however, a failure to file a request to correct excessive PTA is not a violation of the duty.¹⁷⁵ The Patent Office should modify that rule to require the filing of the request whenever the prosecutor becomes aware of the mistake.¹⁷⁶ In addition, it should add a statement in the notice of issuance (which includes the Patent Office's PTA calculation) reminding patent practitioners of their new duty. This change would allow the Patent Office to leverage the prosecutors' expertise and time to fix the software.

Finally, the agency should enact a regulation formally waiving the fee for filing a request for reconsideration in cases when the request asks for a smaller PTA.¹⁷⁷ Although it appears that the current Patent Office practice is to not assess (in some cases, to) fees for

¹⁷² 37 C.F.R. § 42.11(a).

¹⁷³ 37 C.F.R. § 42.11(d)(1).

¹⁷⁴ See, e.g., *Belcher Pharms., LLC v. Hospira, Inc.*, 11 F.4th 1345, 1346–48 (Fed. Cir. 2021); see also Mark A. Lemley & Erich Remiker, *Recent Developments in Patent Law 2022* 36 (SSRN) (June 8, 2022), <https://ssrn.com/abstract=4131632> [<https://perma.cc/FU9A-4T9M>].

¹⁷⁵ MPEP § 2733 (“Note that the Office does not require patentee to file either a request for reconsideration under 37 CFR 1.705(b) or a terminal disclaimer when the patent term adjustment indicated on the patent is greater than what the patentee believes is appropriate.”); see *Treatment of Letters*, *supra* note 31.

¹⁷⁶ Cf. *Boehringer Ingelheim Int'l GmbH v. Barr Lab'ys, Inc.*, 592 F.3d 1340, 1348 (Fed. Cir. 2010) (noting that during the excess period of validity “a patentee enjoys an unjustified advantage—a purported time extension of the right to exclude from the date of the expiration of the earlier patent.”).

¹⁷⁷ Currently, the fee to file a request for reconsideration is \$210.00. 37 C.F.R. §§ 1.705(b)(1), 1.18(e).

requests to lower the PTA¹⁷⁸ (or in some cases, to refund the fees altogether),¹⁷⁹ amending the fee regulation to make this policy clear, might incentivize prosecutors to file more such requests.

C. The Statutory Solution

The third solution is statutory. If increased vigilance from the bar and regulatory fixes fail, Congress should amend the statutory scheme to make patent applicants request PTA without the Patent Office first sharing its calculations. Currently, 35 U.S.C. § 154 states that the agency “Director shall . . . make a determination of the period of any patent term adjustment . . . and shall transmit a notice of that determination no later than the date of issuance of the patent.”¹⁸⁰ Therefore, the examiner is statutorily required to provide the PTA calculation to the patent applicant.¹⁸¹ Congress could amend the statute to instead make applicants petition for PTA, akin to how taxpayers petition the IRS for their tax refunds.¹⁸² If no petition is filed, the PTA shall be set to zero. The patent examiner would then review the filing and compare the requested PTA with the calculations of the computer program. If the two match, it is likely that both are correct since it is hard to imagine the prosecutor and the computer both mistakenly arriving at the same number.

If the two do not match, the examiner should review the PTA logs and determine if the mistake is the computer’s or the patent prosecutor’s. If the former is at fault, the examiner would log a request to the software team to investigate the issue. If the latter, the examiner would grant the request if the prosecutor underestimated the PTA. However, the examiner would have to provide his PTA calculation if the prosecutor overestimated the PTA. As is the case

¹⁷⁸ See, e.g., *Patent Center*, 08/631,331, *supra* note 154.

¹⁷⁹ See, e.g., *In re Application of Lupold*, No. NEX91, Dec. Comm’r Pat. (July 18, 2006).

¹⁸⁰ 35 U.S.C. § 154(b)(3)(B)(i).

¹⁸¹ Alternatively, the Patent Office can take the position that adopting a uniform practice of informing all patent applicants that they are entitled to zero days of PTA would satisfy the statute. This interpretation does not strike me as reasonable and its analysis is beyond the scope of this paper.

¹⁸² See Robert J. Kovacev & Robert C. Morris, *Obtaining IRS Refunds: Procedures and Strategies*, TAX EXEC. (Mar. 9, 2022), <https://taxexecutive.org/obtaining-irs-refunds-procedures-and-strategies/> [<https://perma.cc/QYF9-ERNA>].

currently, the prosecutor would then have a chance, for a fee, to challenge the examiner's PTA.

This solution, however, should be of last resort because it will increase the costs of administering the patent system. Currently, the examiner manually calculates the PTA only if the applicant files a petition for reconsideration and pays a fee.¹⁸³ It is unlikely that Congress will impose a fee on the applicants requesting the PTA they are owed. Thus, the examiner's supplemental work will need to be funded from other sources.

In sum, the issue of inflated PTA can and should be addressed by first increasing awareness of the problem among the patent bar and changing the relevant regulations. If these solutions fail, Congress should amend the statute to force applicants to request, as opposed to being provided, the PTA they are entitled to.

Finally, although this is the first Article that discusses bugs in the Patent Office's software, the issue of administrative agencies using imperfect computer code is far from unique to the patent system. Several Articles have analyzed the implication of agencies using faulty software from a legitimacy standpoint¹⁸⁴ and from a constitutional due process view.¹⁸⁵ Ultimately, my hope is that this article will prompt more researchers to critically examine government software not only in the patent context but beyond.

CONCLUSION

The Patent Office's PTA computer software is buggy. These bugs result in later expiration of patents and, as discussed previously, in some industries such as pharmaceuticals, a delay in competition that hugely benefits consumers. Although such bugs likely plague only a small percent of patents, the patent bar should be on

¹⁸³ See 37 C.F.R. § 1.705(b) (2020).

¹⁸⁴ See, e.g., Ryan Calo & Danielle Keats Citron, *The Automated Administrative State: A Crisis of Legitimacy*, 70 EMORY L.J. 797, 843 (2021).

¹⁸⁵ See, e.g., Margot E. Kaminski & Jennifer M. Urban, *The Right to Contest AI*, 121 COLUM. L. REV. 1957, 1966 (2021); Danielle Keats Citron, *Technological Due Process*, 85 WASH. U. L. REV. 1249, 1257 (2008).

the look-out for these issues and avoid blindly relying on the Patent Office's computer. In turn, the Patent Office should order a rigorous review of its software. If the issue is not successfully resolved, Congress should amend the current statutory regime to require applicants to petition for PTA without the benefit of Patent Office's calculations.