

THE DISCLOSURE FUNCTION OF THE PATENT SYSTEM (OR LACK THEREOF)*

The most commonly offered economic justification for the patent system is that it preserves the incentive for inventors to create, develop, and commercialize new technologies and innovations. Economists and legal commentators often invoke a second economic rationale for the patent system, however: that it “serves to disseminate technological information, and that this accelerates the growth of productivity in the economy.”¹ The courts place a great deal of emphasis on the patent system’s role in disseminating information, and have crafted a number of patent law doctrines to help it accomplish that goal.

This Note examines the potential value of the patent system’s disclosure function and studies the reasons why the U.S. patent system appears to be failing in its ascribed role of disseminating information. Part I summarizes how courts and commentators most often characterize the disclosure function of the patent system and how the rhetoric of “encouraging disclosure” has shaped current patent law. Part II then looks at a variety of evidence showing that the patent system largely fails at its disclosure function. In particular, it examines three assumptions commonly made by those who emphasize the disclosure function of the patent system: that the patent system encourages disclosure of information that would otherwise remain secret; that innovators read through patents looking for new ideas or technologies; and that innovators can easily sort through and find valuable information in the patent records. Section II.A explains that, because of the basic economics behind any decision to patent an invention, much of the information contained in the patent disclosures is available to the public through other channels. Section II.B shows that in response to the Federal Circuit’s willful infringement rules, many U.S. companies now avoid reading patents to protect themselves against the threat of treble damages in an infringement suit. Finally, in section II.C, this Note examines three reasons that patent disclosures fail to convey useful information.

If disclosure is an important policy goal of the patent system, then the system is in desperate need of repair. Courts and policymakers responsible for crafting U.S. patent law should either address these prob-

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¹ SUBCOMM. ON PATENTS, TRADEMARKS & COPYRIGHTS OF THE SENATE COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM 76 (Comm. Print 1958) [hereinafter PATENT SUBCOMM. REPORT] (prepared by Fritz Machlup).

lems, or should focus their reform efforts on reinforcing the incentives for creating, developing, and commercializing innovation. Any part of the patent system that is inconsistent with those goals should be abandoned.

I. THE DISCLOSURE FUNCTION OF THE PATENT SYSTEM: THEORY

According to the courts, the “twin purposes” of the patent system are “encouraging new inventions” and “adding knowledge to the public domain.”² The former economic justification — creating financial incentives for the creation, development, and commercialization of valuable inventions — is probably the most important rationale.³ Patents are often essential for inventions that are easier to reverse engineer and copy than to actually invent. Otherwise, competitors would quickly imitate such inventions, and these free riders would drive down prices, thereby preventing the inventor from profiting off her invention.⁴ Inventors would be forced to protect themselves by skewing their innovative activity toward inventions that are difficult to reverse engineer.⁵ The patent system addresses this problem by allowing inventors to prevent others from making, using, or selling their invention without authorization.⁶

An important secondary purpose of the patent system, however, is to encourage disclosure of information about new technologies and in-

² *Eldred v. Ashcroft*, 537 U.S. 186, 226–27 (2003) (Stevens, J., dissenting); *see also, e.g.*, *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 63 (1998) (stating that the patent system should be thought of as “a carefully crafted bargain that encourages both the *creation* and the *public disclosure* of new and useful advances in technology, in return for an exclusive monopoly for a limited period of time” (emphases added)). According to economists, there are at least four distinct economic justifications for the patent system: stimulating inventive activity, motivating the development and commercialization of inventions, encouraging disclosure of information, and allowing for more efficient exploration of prospective inventions. *See* Roberto Mazzoleni & Richard R. Nelson, *The Benefits and Costs of Strong Patent Protection: A Contribution to the Current Debate*, 27 RES. POL’Y 273, 274–300 (1998).

³ *See, e.g.*, Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1597 n.65 (2003); Mazzoleni & Nelson, *supra* note 2, at 274–80; *see also* Peter S. Menell, *Intellectual Property: General Theories*, in 2 ENCYCLOPEDIA OF LAW AND ECONOMICS: CIVIL LAW AND ECONOMICS 129, 130–48, 155–56 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000) (surveying the economic literature that reflects the predominance of the incentive to invent rationally).

⁴ *See, e.g.*, WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 294 (2003); STEVEN SHAVELL, *FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW* 138 (2004); Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1028–29 (1989).

⁵ *See, e.g.*, LANDES & POSNER, *supra* note 4, at 328.

⁶ *See* 35 U.S.C. § 271(a) (2000). For a brief discussion of the patent system’s approach to this problem, *see* Eisenberg, *supra* note 4, at 1028–29. For an extended discussion, *see* Menell, *supra* note 3, at 130–48.

novations.⁷ To achieve this goal, federal law requires patent applicants to provide a “full” and “clear” description of their invention, including the “exact terms” of its manufacture and use.⁸ Most patent applications are published eighteen months after they are filed,⁹ and made available on the United States Patent and Trademark Office website¹⁰ and various commercial databases.¹¹ Although the owner of a patent has exclusive rights to her invention for twenty years after the filing date,¹² the information disclosed in the patent theoretically produces three distinct benefits for the public: helping spur further innovation, reducing wasteful duplicative research, and leading to more efficient investment in innovation.

A. *An Economic Analysis of the Disclosure Function of Patents*

As the Supreme Court explained in *Kewanee Oil Co. v. Bicron Corp.*,¹³ the disclosure of patent applications adds to the public’s “general store of knowledge” and “is assumed [to] stimulate ideas and the eventual development of further significant advances in the art.”¹⁴ Many economists believe that patent disclosures have the potential to

⁷ See, e.g., LANDES & POSNER, *supra* note 4, at 329–30; NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS., A PATENT SYSTEM FOR THE 21ST CENTURY 41 (Stephen A. Merrill et al. eds., 2004) [hereinafter NAT’L RESEARCH COUNCIL]; Eisenberg, *supra* note 4, at 1028–30; Mazzoleni & Nelson, *supra* note 2, at 278–80.

⁸ See 35 U.S.C. § 112 (2000).

⁹ See *id.* § 122(b). But see *infra* section II.C.1, p. 2024 (discussing an important exception to the eighteen-month publication rule).

¹⁰ See United States Patent and Trademark Office, Patent Full-Text and Full-Page Image Databases, at <http://www.uspto.gov/patft> (last visited Mar. 13, 2005).

¹¹ See Patent Law Links, Patent Search Engines, at <http://www.patentlawlinks.com/patsearc.htm> (last visited Mar. 13, 2005).

¹² 35 U.S.C. § 154(a)(2) (2000).

¹³ 416 U.S. 470 (1974).

¹⁴ *Id.* at 481; see also *Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy: Hearing Before the Fed. Trade Comm’n* 39 (Feb. 6, 2002) (statement of Judge Pauline Newman, U.S. Court of Appeals for the Federal Circuit) (“In virtually all fields of technology today . . . , patents are the major if not the only source of technical information.”), available at <http://www.ftc.gov/opp/intellect/020206trans.pdf>; Robert G. Bone, *A New Look at Trade Secret Law: Doctrine in Search of Justification*, 86 CAL. L. REV. 241, 266 (1998) (“If an inventor chooses trade secret instead of patent, . . . future innovators will not be able to learn from the scientific and technological insights that led to the original invention, slowing the overall rate of innovation.”); Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 267 (1994) (“[A] patent communicates a considerable amount of information that can help other would-be inventors, including rival firms.”); R. Polk Wagner, *Information Wants To Be Free: Intellectual Property and the Mythologies of Control*, 103 COLUM. L. REV. 995, 1000 (2003) (“[B]ecause even perfectly controlled works nonetheless transfer significant information into the public domain, it turns out that over the long term, additional control is likely to stimulate additional works — and thus grow the public domain, even assuming no access to the protected work itself.”). For a discussion of some historical evidence suggesting that the patent system spurs innovation because “‘leaks’ in the grant to one inventor benefitted other inventors,” see ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY* 6 (3d ed. 2002).

cause “R&D spillovers[, which] are a key source of productivity growth.”¹⁵ While some suspect that the inventions that are patented are those easy to reverse engineer (and therefore the disclosure is of limited value),¹⁶ others believe patents can still encourage the disclosure of some inventions that would otherwise be kept secret.¹⁷ Additionally, even if the patentee’s competitors would learn of the invention through reverse engineering, the patent may “give ‘ideas’” to engineers in other industries who would otherwise never hear about the technology, and thus allows everyone the opportunity of discovering new ways of using it.¹⁸ Moreover, patents may help accelerate the process of cumulative innovations because they encourage inventors to patent and disclose small technological advances, allowing everyone in the field to build upon one another’s work continually.¹⁹

The patent system also theoretically prevents wasteful duplication of the original inventor’s research because the patents not only disclose how to make and use the claimed invention, but also notify the public of the patentee’s exclusive rights to that technology.²⁰ There is an important qualification to this argument, however. Because the patent system rewards only the first to invent, it causes wasteful “patent races” during the earlier stages of research and development, when multiple firms expend tremendous resources racing to be the first to the patent office.²¹ Nonetheless, even if the patent system as a whole does not reduce the overall level of wasteful research, the disclosure function is still socially desirable to the extent that it reduces duplicative research after a patent has been published.

Finally, incomplete information regarding which technologies are patented will subject inventors to the risk of unexpected infringement

¹⁵ WESLEY M. COHEN ET AL., PROTECTING THEIR INTELLECTUAL ASSETS: APPROPRIABILITY CONDITIONS AND WHY U.S. MANUFACTURING FIRMS PATENT (OR NOT) 24–25 (Nat’l Bureau of Econ. Research, Working Paper No. 7552, 2000), available at <http://www.nber.org/papers/w7552>.

¹⁶ Fritz Machlup & Edith Penrose, *The Patent Controversy in the Nineteenth Century*, 10 J. ECON. HIST. 1, 26–28 (1950) (recounting debates among European economists during the mid-nineteenth century over the alleged disclosure value of the patent system).

¹⁷ See, e.g., Vincenzo Denicolò & Luigi Alberto Franzoni, *The Contract Theory of Patents*, 23 INT’L REV. L. & ECON. 365, 366–68 (2004); Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, J. ECON. PERSP., Winter 1991, at 29, 39.

¹⁸ PATENT SUBCOMM. REPORT, *supra* note 1, at 76; see also LANDES & POSNER, *supra* note 4, at 329 (arguing that the public might discover new uses for the patented invention that the patentee never thought to market or license).

¹⁹ Suzanne Scotchmer & Jerry Green, *Novelty and Disclosure in Patent Law*, 21 RAND J. ECON. 131, 132 (1990); Scotchmer, *supra* note 17, at 39; see also *Brenner v. Mason*, 383 U.S. 519, 539 (1966) (Harlan, J., dissenting).

²⁰ See Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 278 (1977); see also LANDES & POSNER, *supra* note 4, at 360–61; Bone, *supra* note 14, at 266–67; Denicolò & Franzoni, *supra* note 17, at 368; Eisenberg, *supra* note 4, at 1027–28.

²¹ See, e.g., LANDES & POSNER, *supra* note 4, at 300–02; SHAVELL, *supra* note 4, at 144–45.

suits and thus discourage innovative activity. As the Supreme Court has explained in decisions regarding the interpretation of patent claims, the courts must give patents unambiguous boundaries for “the encouragement of the inventive genius of others Otherwise, a zone of uncertainty . . . would discourage invention only a little less than unequivocal foreclosure of the field.”²² Similarly, unless the public knows which technologies have been patented, it will be unable to invest efficiently in innovations. Moreover, if patents are not properly disclosed, there will be wasteful litigation, and some companies may be deterred from investing in innovation by the risk of litigation.

B. The Disclosure Function of Patents According to the Courts

While most scholars believe that the principal goal of the patent system is the encouragement of innovation,²³ courts have been more willing to embrace the disclosure rationale as a centerpiece of patent policy.²⁴ Occasionally courts even advance the disclosure function as the primary justification for the patent system. In *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*,²⁵ for example, the Supreme Court unanimously declared that “the ultimate goal of the patent system is to bring new designs and technologies into the public domain through disclosure.”²⁶ Likewise, in *J.E.M. AG Supply, Inc. v. Pioneer Hi-Bred International, Inc.*,²⁷ the Court proclaimed that “[t]he disclosure required by the Patent Act is ‘the *quid pro quo* of the right to exclude.’”²⁸ The Federal Circuit, which hears the bulk of patent in-

²² *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390 (1996) (quoting *General Electric Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 369 (1938); and *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 236 (1942)) (internal quotation marks omitted); see also *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 730–31 (2002) (“The monopoly is a property right; and like any property right, its boundaries should be clear. This clarity is essential to promote progress, because it enables efficient investment in innovation.”).

²³ See Menell, *supra* note 3, at 130–48, 155–56.

²⁴ See, e.g., *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 63 (1998) (stating that the patent system should be thought of as “a carefully crafted bargain that encourages both the *creation* and the *public disclosure* of new and useful advances in technology, in return for an exclusive monopoly for a limited period of time” (emphases added)); *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150–51 (1989); *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 186–87 (1933) (“In consideration of [an invention’s] disclosure and the consequent benefit to the community, the patent is granted.”). *But see* *Brenner v. Mason*, 383 U.S. 519, 533–35 (1966) (openly questioning the importance of the disclosure function and recharacterizing “[t]he basic *quid pro quo* contemplated by the Constitution” as a grant of “patent monopoly” in exchange for “the benefit derived by the public for an invention with substantial utility”).

²⁵ 489 U.S. 141.

²⁶ *Id.* at 151 (holding that a state law prohibiting a form of reverse engineering violated the Supremacy Clause).

²⁷ 534 U.S. 124 (2001).

²⁸ *Id.* at 142 (quoting *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 484 (1974)) (holding that utility patents may be issued for newly developed plant breeds).

fringement suits, frequently uses the same rhetoric, describing disclosure as the “linchpin”²⁹ and “*quid pro quo*”³⁰ of the patent system.

It is not clear why the courts rely so heavily on the disclosure rationale. Some speculate this justification comes from a time when most inventions were held in the custody of individuals rather than companies, and courts feared that inventors would take their secrets to the grave unless they filed for a patent.³¹ Alternatively, the courts may be relying on the disclosure rationale simply by default. Patent cases always involve inventions that have already been made, at which point the first of the “twin purposes” of the patent system — providing incentives for future innovation — necessarily conflicts with the public’s interest in competitive pricing. Consequently, the incentive-to-invent policy argument may be harder to apply in individual patent infringement suits than the disclosure rationale.³²

Regardless of the courts’ underlying reasoning, however, the perceived importance of disclosure has played an important role in shaping patent law. For example, the Federal Circuit’s “written description requirement” can be used to invalidate patents on the grounds of insufficient disclosure, even when the application contains enough information to enable anyone familiar with the relevant background

²⁹ *E.g.*, *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983).

³⁰ *E.g.*, *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 970 (Fed. Cir. 2002). *But see* *Paulik v. Rizkalla*, 760 F.2d 1270, 1276 (Fed. Cir. 1985) (“[T]he obligation to disclose is not the principal reason for a patent system; indeed, it is a rare invention that cannot be deciphered more readily from its commercial embodiment than from the printed patent.”).

³¹ *See* *Mazzoleni & Nelson*, *supra* note 2, at 278 (citing PATENT SUBCOMM. REPORT, *supra* note 1, at 21). This reasoning may explain why the Court has said that patent disclosures benefit the public when, “upon the expiration of [the patent] period, the knowledge of the invention inures to the people, who are thus enabled without restriction to practice it and profit by its use.” *Bonito Boats*, 489 U.S. at 151 (quoting *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 186–87 (1933)). At first glance this argument seems strange, because most inventors who can keep their invention secret for longer than the twenty year patent term (as did The Coca-Cola Company with its secret formula) will probably opt for trade secrecy. *See* *Eisenberg*, *supra* note 4, at 1029. However, if the Court is worried that private inventors might die before their invention can be reverse engineered or disclosed, possibly depriving the public of ever discovering the inventor’s secret, then the Court’s argument makes a little more sense. *But cf.* Donald S. Chisum, *Nies Memorial Lecture, The Supreme Court and Patent Law: Does Shallow Reasoning Lead to Thin Law?*, 3 MARQ. INTELL. PROP. L. REV. 1, 16 (1999) (arguing that the Supreme Court fails to understand the complexity of the patent system and that “the Justices seem to treat patent cases as second class citizens and write opinions that read as though they were dictated while standing waiting for the elevator”).

³² A similar problem presents itself in the tort of unfair competition. *Compare* *Int’l News Serv. v. Associated Press*, 248 U.S. 215, 240 (1918) (grounding the tort of “unfair competition in business” in “[t]he underlying principle . . . that he who has fairly paid the price should have the beneficial use of the property”), *with* *Am. Safety Table Co. v. Schreiber*, 269 F.2d 255, 272 (2d Cir. 1959) (“[I]mitation is the life blood of competition. It is the unimpeded availability of substantially equivalent units that permits the normal operation of supply and demand to yield the fair price society must pay for a given commodity.”).

technology to make and use the invention.³³ This rule has been criticized for imposing heightened barriers to patent and deterring innovation,³⁴ but the Federal Circuit defends its position by claiming that the written description requirement “serves a teaching function, as a ‘*quid pro quo*’ in which the public is given ‘meaningful disclosure in exchange for being excluded from practicing the invention’”³⁵ Similarly, under Federal Circuit law, if one person discovers an invention and exploits it in secret, and subsequently that same invention is discovered and patented by another, there is no prior use defense, and the first inventor will therefore be excluded from the invention’s use.³⁶ Although scholars have criticized this rule for reducing the incentive to create inventions best protected by trade secrecy,³⁷ the Federal Circuit again responded by arguing that “[e]arly public disclosure is a linchpin of the patent system.”³⁸ More generally, questions regarding the public notice function play an important role in many of the most controversial issues before the Federal Circuit today, including the interpretation of claim language in patents.³⁹

These judicial doctrines highlight the practical importance of the disclosure rationale in patent law. Their wisdom is directly related to their function in promulgating the advantages theoretically served by patent disclosures. Accordingly, it is worth determining whether the patent system actually disseminates information to the public.

II. THE DISCLOSURE FUNCTION OF THE PATENT SYSTEM: PRACTICE

When courts and commentators analyze the social benefits of patent disclosure, they typically assume that the patent system actually

³³ See *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 921–22 (Fed. Cir. 2004); *Enzo Biochem*, 323 F.3d at 963; *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566, 1568 (Fed. Cir. 1997).

³⁴ See, e.g., Dan L. Burk, *Biotechnology in the Federal Circuit: A Clockwork Lemon*, 46 ARIZ. L. REV. 441, 441–42, 448–50 (2004); Dan L. Burk & Mark A. Lemley, *Biotechnology’s Uncertainty Principle*, 54 CASE W. RES. L. REV. 691, 714–16 (2004).

³⁵ *Univ. of Rochester*, 358 F.3d at 922 (quoting *Enzo Biochem*, 323 F.3d at 970).

³⁶ See *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983); Mark A. Lemley & Ragesh K. Tangri, *Ending Patent Law’s Willfulness Game*, 18 BERKELEY TECH. L.J. 1085, 1102 (2003).

³⁷ See, e.g., LANDES & POSNER, *supra* note 4, at 360–62.

³⁸ *W.L. Gore*, 721 F.2d at 1550.

³⁹ See, e.g., *Phillips v. AWH Corp.*, No. 03-1269, slip op. at 3–4 (Fed. Cir. July 21, 2004) (order granting rehearing en banc) (requesting amicus briefs that address questions such as whether “the public notice function of patent claims [is] better served by referencing primarily to technical and general purpose dictionaries . . . or by looking primarily to the patentee’s use of the term in the specification”).

disseminates the information contained in patents.⁴⁰ At least one study, however, found that patent disclosures have almost no impact on the flow of information between firms in the U.S.⁴¹ Another showed that U.S. firms most often use sources other than patent disclosures to learn about the most recent technological advances in their industry.⁴² This Part looks at why that might be the case. In particular, it examines three assumptions behind the disclosure rationale for the patent system: that patents contain information not otherwise available to the public; that inventors are willing to read patents to look for information about new technologies and innovations; and that inventors are able to find and extract valuable information from the patent records.

A. The First Assumption: The Patent System Encourages the Disclosure of Information That Would Otherwise Remain Secret

Courts frequently recite the mantra that disclosure is the quid pro quo of the right to a patent.⁴³ The underlying premise of their claim is that when an inventor files for a patent, she discloses information to which the public would not otherwise have access in exchange for the exclusive rights to her invention.⁴⁴ If true, then inventors would have good reason to spend their time searching through the patent records for new ideas or valuable technologies. However, the Court's quid pro

⁴⁰ See, e.g., PATENT SUBCOMM. REPORT, *supra* note 1, at 76 (“The claim that the patent system serves to disseminate technological information . . . is not questioned.”).

⁴¹ ASHISH ARORA ET AL., R&D AND THE PATENT PREMIUM 17 (Nat’l Bureau of Econ. Research, Working Paper No. 9431, 2003) (finding that “patent disclosures appeared to have no measurable impact on information flows from other firms, and therefore no measurable effect on R&D productivity”), available at <http://www.nber.org/papers/w9431>.

⁴² See Wesley M. Cohen et al., *R&D Spillovers, Patents and the Incentives To Innovate in Japan and the United States*, 31 RES. POL’Y 1349, 1362–64 (2002) (finding that U.S. companies seeking information about new technologies find publications and informal information exchanges more useful than patent disclosures, which were ranked on par with conferences and studies of competitors’ products).

The same appears to be true in Europe, where patents have only a minor effect on the flow of information between firms. See Anthony Arundel, *Patents in the Knowledge-Based Economy* (2000) (manuscript at 12–14, on file with the Harvard Law School Library), http://www.iue.it/Personal/bhall/Arundeloo_Ipsurvey.pdf, published at 37 BELEIDSTUDIES TECHNOLOGIE ECONOMIE 67 (2001) (“A consistent result in survey research on the use of patent databases is that they are among the *least* important external information sources available to firms . . .”); DIRECTORATE-GEN. ENTER., EUR. COMM’N, PATENT PROTECTION OF COMPUTER PROGRAMMES: FINAL REPORT (Contract No. INNO-99-04, 2001) (submitted by Puay Tang et al.). Interestingly, the patent system in Japan appears to be much more effective at disclosing information about new technologies. See Cohen et al., *supra*, at 1362–64.

⁴³ See, e.g., sources cited *supra* notes 24–30.

⁴⁴ See *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150–51 (1989); *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 186–87 (1933) (“In consideration of [an invention’s] disclosure and the consequent benefit to the community, the patent is granted.”); see also Eisenberg, *supra* note 4, at 1028.

quo theory of patents overlooks two important constraints on the patent system's ability to induce disclosure.

First, the reason why many inventors file for a patent is that their secret will be disclosed to the public as soon as they begin using or selling their inventions.⁴⁵ As one intellectual property attorney explained, "[p]atenting is a 'must' if the innovation can be easily reverse-engineered. . . . Whenever public disclosure of the innovation is required, a patent application should be filed."⁴⁶ Accordingly, in industries like pharmaceuticals and chemical engineering, where the costs of reverse engineering an invention are much lower than the inventor's research expenses, and where there are potential profits to be made by selling imitation products, the quid pro quo disclosure rationale is misleading because the invention would be disclosed to the public regardless.⁴⁷

Second, many inventions that are difficult to reverse engineer will never be patented because the inventor would be unable to detect infringement, rendering the patent of little value. As one commentator explained, "any technology that can be exploited in secrecy by its inventor can probably also be exploited in secrecy by an infringer, making a patent on such an invention difficult to enforce."⁴⁸ Survey data from U.S. companies lend support to this hypothesis, showing that in industries where trade secrecy is most effective, the disclosure requirement becomes a greater deterrent to patenting.⁴⁹ Studies of U.S. manufacturing firms show that process innovations are much less likely to be patented than product innovations,⁵⁰ which is probably because it is difficult to catch someone infringing a process patent. The same is true for many innovations in business methods and software, which can often be practiced in secret by both the inventor and an infringer.⁵¹ Likewise, companies in the computer hardware indus-

⁴⁵ See COHEN ET AL., *supra* note 15, at 17 (finding that U.S. firms give "prevention of copying" as the most common motive for patenting).

⁴⁶ Holly M. Amjad, *Patent vs. Trade Secret: Look at Costs, Industry, Returns*, BUS. J. KAN. CITY, Feb. 1, 2002, <http://kansascity.bizjournals.com/Kansascity/stories/2002/02/04/smallb3.html>.

⁴⁷ See Frederic M. Scherer, *The Economics of Human Gene Patents*, 77 ACAD. MED. 1348, 1351-52 (2002); James D. Hamilton & William E. Beaumont, *Licensing Patents and Trade Secrets* § 1.10 (June 2000), at <http://www.oblon.com/media/index.php?id=53> (on file with the Harvard Law School Library).

⁴⁸ Eisenberg, *supra* note 4, at 1029.

⁴⁹ See Richard C. Levin et al., *Appropriating the Returns from Industrial Research and Development*, in 3 BROOKINGS PAPERS ON ECON. ACTIVITY 783, 805 (1987).

⁵⁰ See COHEN ET AL., *supra* note 15, at 10; Levin et al., *supra* note 49, at 803; cf. Arundel, *supra* note 42 (manuscript at 10) (discussing survey data showing that European companies consider secrecy more valuable than patents in protecting their process innovations).

⁵¹ See Peter J. Toren, *Protecting Inventions as Trade Secrets: A Better Way When Patents Are Inappropriate*, *Unavailable* (2000), FINDLAW, at <http://library.lp.findlaw.com/articles/file/00382/005925.html> ("Methods, including business methods, are published in a patent for the world to see, but often it can be impossible to determine if a competitor is using the patented method or

try rarely patent inventions that can be kept secret. As one executive explained:

[I]n general we will choose not to patent if we believe we can keep it a trade secret because we're just publishing something that someone else could then use and we would never know it. . . . Most of the companies that I visit with and compare notes, it's always detectability and trade secret issues that are part of their criteria for patenting these days, and they're not going to disclose things that they can keep trade secrets. The patent system, in my opinion, doesn't help cause people to disclose things.⁵²

In the end, the patent system probably encourages disclosure of useful information in only a narrow class of the overall intellectual property economy. The primary function of the patent system is to protect inventions that are easy to reverse engineer, but information on such technology is usually available without the disclosure requirement. For many inventions that are costly or impossible to reverse engineer, however, inventors are unlikely to use the patent system, and no information is disclosed. Consequently, disclosure is less the *quid pro quo* of the patent system than it is the reason for having a patent system, and it is doubtful whether stronger patent protection leads to more disclosure in most industries.

The failure of the *quid pro quo* rationale of the patent system does not necessarily undermine the entire economic value of patent disclosures, however. Although most patented inventions can be uncovered through reverse engineering, and the patent system is therefore of limited value in promoting R&D spillovers and cumulative innovations, there are some exceptions. In pharmaceuticals, for example, it takes years for most patented inventions to reach the market,⁵³ and patent disclosures can therefore provide public access to the information long before it could be reverse engineered from the final product.⁵⁴ More-

process to produce the end product. . . . The information needed to file a patent infringement suit under these circumstances may be very difficult — or impossible — to obtain.”)

⁵² *Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy: Fed. Trade Comm'n Workshop* 756 (Feb. 28, 2002) [hereinafter *FTC Transcript, 2/28/02*] (statement of Robert Barr), available at <http://www.ftc.gov/opp/intellect/020228trans.pdf>; see also *Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy: Hearing Before the Fed. Trade Comm'n* 49–50 (Mar. 20, 2002) [hereinafter *FTC Transcript, 3/20/02*] (statement of Daniel McCurdy), available at <http://www.ftc.gov/opp/intellect/020320trans.pdf>.

⁵³ See FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY ch. 3, at 4–8 (2003) [hereinafter *FTC REPORT*], available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf>.

⁵⁴ This may explain why companies in the pharmaceutical industry report using patent disclosures as a source of information more often than those in other industries. See *id.* ch. 3, at 10, 32–33, 49–50.

over, because reverse engineering can be expensive,⁵⁵ patent disclosures may be more efficient at broadly disseminating information, specifically to companies outside the patentee's industry.⁵⁶ Additionally, published patents could still help reduce wasteful duplicative research and spur efficient innovation by clearly signaling which technologies have been patented. Consequently, even though most patented inventions would have been disclosed by means other than their patent filings, the patent system could still hypothetically serve its disclosure function.

B. The Second Assumption: Inventors Look Through the Patent Records Searching for New Ideas and Technologies

Even if the patent records contain valuable information not otherwise available to the public, that information is of little use if inventors are afraid to read those patents. The disclosure rationale assumes not only that the public has access to patent filings, but also that the potential benefits from reading patents are greater than the costs. Due to the Federal Circuit's willful infringement rules, however, many innovators now avoid reading patents to protect themselves from treble damage awards in infringement suits. These rules consequently undermine the disclosure function of the patent system.

1. *Summary of the Willful Infringement Rules.* — In most areas of the law, courts award punitive damages only when the defendant's conduct is found to be "reprehensible."⁵⁷ The willful infringement rules in patent law are significantly less stringent. Under statute, the court can both award attorneys' fees and enhance damages by "up to three times the amount found or assessed."⁵⁸ The Federal Circuit imposes this liability if a defendant found guilty of patent infringement had "actual notice of [the plaintiff's] patent rights" and failed "to exercise due care to determine whether or not he [was] infringing" upon those rights.⁵⁹

⁵⁵ See, e.g., Michael W. Toffel, *Strategic Management of Product Recovery*, 46 CAL. MGMT. REV. 120, 129 (2004) (noting that among firms who refurbish technological equipment, "[r]everse engineering is expensive and time consuming, averaging \$37,000 and 23 days per product").

⁵⁶ At the same time, the patent system as a whole may force competitors to expend more time and resources designing around a patent than they would have spent reverse engineering the invention.

⁵⁷ See, e.g., *State Farm Mut. Auto. Ins. Co. v. Campbell*, 538 U.S. 408, 419 (2003) (applying the Due Process Clause to limit punitive damages in an intentional tort suit).

⁵⁸ 35 U.S.C. § 284 (2000).

⁵⁹ *Underwater Devices Inc. v. Morrison-Knudsen Co.*, 717 F.2d 1380, 1389 (Fed. Cir. 1983). For a good summary of the willful patent infringement doctrine, see Madeline F. Baer & John Dauer, *Willful Patent Infringement*, in PATENT LITIGATION 2004, at 883 (PLI Pats., Copyrights, Trademarks, and Literary Prop. Course, Handbook Series No. 3149, 2004), WL 804 PLI/Pat 883. For a discussion of the possible conflict between the Federal Circuit's willful infringement doctrine and the Supreme Court's holding in *State Farm*, see *Knorr-Bremse Systeme Fuer*

The current “actual notice” rules create what is essentially a hair-trigger on the “affirmative duty to exercise due care” requirement. For example, once a company’s in-house engineers or patent attorneys learn of a patent, the notice requirement is met, and the company must take due care to avoid infringement.⁶⁰ As one intellectual property attorney explained, “the [patent] system discourages you from looking very hard [at patent disclosures] because . . . simply by virtue of poking around to find out what patents exist you expose yourself to willfulness claims which can triple the amount of damages and exposure to attorney’s fees.”⁶¹

Once an innovator has knowledge of a patent, however, the law requires her to “exercise due care” to avoid infringing it. A finding of failure to take due care — and the imposition of heightened damages for willful infringement — depends on “whether the infringer, when it knew of the other’s patent protection, investigated the scope of the patent and formed a good-faith belief that it was invalid or that it was not infringed” by the new product.⁶² Such an investigation “[u]sually . . . includes seeking and obtaining competent legal advice before engaging in activity that may result in infringement.”⁶³ In fact, the

Nutzfahrzeuge GmbH v. Dana Corp., 383 F.3d 1337, 1350–51 (Fed. Cir. 2004) (Dyk, J., concurring in part and dissenting in part).

⁶⁰ See *Stryker Corp. v. Intermedics Orthopedics, Inc.*, 96 F.3d 1409, 1414–16 (Fed. Cir. 1996) (upholding the district court’s finding that the infringer had actual notice of a patent when its in-house patent counsel saw reference to the patent in the *Official Gazette of the United States Patent Office*); see also Baer & Dauer, *supra* note 59, at 888; Lemley & Tangri, *supra* note 36, at 1090 (“Defendants may become aware of a patent in several ways,” such as “if one of its engineers regularly reads new patents in her field.”).

⁶¹ See FTC REPORT, *supra* note 53, ch. 3, at 49 (alterations in original). An executive in the software industry explained how the willfulness rules deter companies from reading one another’s patents:

My first introduction to the way to deal with patents by my attorneys was, for the love of God, don’t look at them I simply didn’t look at any patents and I never went to the USPTO site, and if anybody mentioned a patent I burned it as quickly as possible.

I’ve recently reversed that process, simply because I’ve been asked to sign these warrants and I kind of feel like I need to know what I’m warranting. That puts me in a very precarious position.

. . . [I]f you could fix that, that would be great.

Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy: Fed. Trade Comm’n Workshop 420–21 (Feb. 27, 2002) [hereinafter *FTC Transcript*, 2/27/02] (statement of Jordan Greenhall), available at <http://www.ftc.gov/opp/intellect/020227trans.pdf>.

⁶² *Stryker*, 96 F.3d at 1414 (quoting *Stryker Corp. v. Intermedics Orthopedics, Inc.*, 891 F. Supp. 751, 814 (E.D.N.Y. 1995)) (internal quotation marks omitted); see also *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 826–27 (Fed. Cir. 1992) (listing other relevant considerations in a willfulness finding); Matthew D. Powers & Steven C. Carlson, *The Evolution and Impact of the Doctrine of Willful Patent Infringement*, 51 SYRACUSE L. REV. 53, 55–82 (2001) (discussing how the affirmative duty rule “crept its way into the law”).

⁶³ *Stryker*, 96 F.3d at 1414; see also Baer & Dauer, *supra* note 59, at 889–92 (summarizing much of the case law on the duty to obtain legal advice).

courts used to make an adverse inference of willfulness if an infringer failed to produce an exculpatory opinion letter at trial.⁶⁴ Although the Federal Circuit recently dropped that rule,⁶⁵ it has failed to articulate a reliable alternative for innovators to meet their affirmative duty. Accordingly, most intellectual property lawyers expect that “in many circumstances the advisability of obtaining . . . attorney opinions is likely to remain unchanged.”⁶⁶ Combined with the Federal Circuit’s hair-trigger notice standards, the affirmative duty requirement means that “[w]hen an innovator searches the U.S. patents of competitors and others, the innovator faces the real risk that it must have an expensive and time consuming legal opinion prepared by a competent patent specialist in order to shield itself from willful infringement of the patent in a later dispute.”⁶⁷

2. *Reaction to the Willful Infringement Rules.* — The disclosure function of the patent system would work best if innovators could read patents freely, expending only the value of their time. Unfortunately, whenever innovators read a patent, they lay the groundwork for a later finding of willful infringement. Consequently, innovators must weigh the cost of either an opinion letter or the increased risk of enhanced damages against the potential benefits from reading patents. Faced with this calculation, many innovators have ceased using pat-

⁶⁴ See *Electro Med. Sys., S.A. v. Cooper Life Scis., Inc.*, 34 F.3d 1048, 1056 (Fed. Cir. 1994).

⁶⁵ See *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337, 1341, 1345–47 (Fed. Cir. 2004) (en banc) (holding that “no adverse inference . . . flows from an alleged infringer’s failure to obtain or produce an exculpatory opinion of counsel”). The decision to abandon the “adverse inference” rule garnered wide support. See Brenda Sandburg, *Lawyers Stump for End to Tough Patent Policy*, PAT. STRATEGY & MGMT., Dec. 2003, at 3.

⁶⁶ John M. Golden & Peter M. Dichiara, Knorr-Bremse: *Elimination of the Adverse Inference*, at http://www-haledorr-com.origin.hubbardone.com/publications/pub_detail.aspx?ID=2831&Type=5543 (Nov. 4, 2004); see also Emily A. Evans, Knorr-Bremse: *The Federal Circuit Overrules Its Precedent and Reshapes Willfulness*, IPL NEWSL., Fall 2004, at 12, 15 (arguing that Knorr-Bremse “begs the question of what steps would be sufficient in the absence of exculpatory advice of counsel”), available at http://www.abanet.org/intelprop/newsletter/ipl_fall_04.pdf; Lisa S. Mankofsky, Knorr-Bremse: *The Federal Circuit Changes the Law on Opinion of Counsel*, at http://www.foley.com/publications/pub_detail.aspx?pubid=2396 (Nov. 9, 2004) (“Because an accused infringer must still show that it acted with due care . . . , an accused infringer would be well served to still obtain an opinion of counsel.”). Even before the Knorr-Bremse decision, commentators had opined that “while eliminating the adverse inference from failure to disclose an opinion of counsel may be a good idea, . . . [t]he defendant’s best hope of avoiding liability for willfulness is [still] to rely on the advice of counsel.” Lemley & Tangri, *supra* note 36, at 1115.

⁶⁷ Robert Greene Sterne & David K.S. Cornwell, *Monitoring the U.S. Patents of Competitors: The Willfulness Risks to the Innovator*, in *PLI’S NINTH ANNUAL INSTITUTE FOR INTELLECTUAL PROPERTY LAW* 241, 251 (PLI Pats., Copyrights, Trademarks, and Literary Prop. Course, Handbook Series No. G0-016V, 2003), WL 764 PLI/Pat 241; see also William P. Lee & Lawrence P. Cogswell, III, *Understanding and Addressing the Unfair Dilemma Created by the Doctrine of Willful Patent Infringement*, 41 HOUS. L. REV. 393, 448 (2004); Lemley & Tangri, *supra* note 36, at 1100.

ents as a research tool; they either use them only to search for potential infringement problems, or simply avoid reading them altogether.

Given the prevalence of willful infringement verdicts in patent suits, innovators are exposed to significant financial risk whenever they search through the patent records. The number of patent infringement suits has soared in recent years,⁶⁸ and at last count, approximately ninety-two percent of those suits involved allegations of willfulness.⁶⁹ In those cases where the issue of willfulness was determined at trial,⁷⁰ more than fifty-five percent of defendants were held liable for willful infringement and approximately thirty-two percent had to pay enhanced damages,⁷¹ usually double or triple the award.⁷² Given that the average damage verdict in patent suits from 1990 to 2000 was \$24 million,⁷³ the willfulness rules have created what intellectual property lawyers describe as an “in terrorem effect of the fear of treble damages”:⁷⁴ innovators are under pressure either to remain unaware of the patent landscape in their field, or to obtain opinion letters as a preemptive measure against willfulness charges.⁷⁵

The option of procuring opinion letters is often economically infeasible, however, especially if the innovator has conducted an extensive search through the patent records. Opinion letters must include a “thorough and competent” review of the issued patent and are supposed to come from an outside patent attorney rather than an in-house attorney or engineer.⁷⁶ Consequently, such letters cost at least \$20,000,

⁶⁸ See LANDES & POSNER, *supra* note 4, at 348 fig. 12.4; NAT'L RESEARCH COUNCIL, *supra* note 7, at 32 (noting that the total number of patent infringement suits filed in federal courts doubled between 1988 and 2001).

⁶⁹ Kimberly A. Moore, *Empirical Statistics on Willful Patent Infringement*, 14 FED. CIR. B.J. 227, 232 (2004).

⁷⁰ It appears that the issue of willfulness is decided in about forty percent of all patent cases that go to trial. See *id.* at 237 (noting that 664 of the 1585 patent trials tried from 1983 to 2000 decided a charge of willfulness).

⁷¹ *Id.* at 236; see also Jennifer L. Knabb & Michael J. Jeffords, *Trends in Patent Infringement Damages*, IPL NEWSL., Spring 2003, at 22, 28 (reporting that twenty-seven percent of damage awards since 2000 were enhanced by the court), available at http://www.abanet.org/intelprop/bulletin/spring_03.pdf. In total, approximately eight percent of all patent trials result in enhanced damages for willfulness. Moore, *supra* note 69, at 237.

⁷² See Knabb & Jeffords, *supra* note 71, at 28; Moore, *supra* note 69, at 237 fig.1.

⁷³ Kathleen M. Kedrowski & Jennifer L. Knabb, *An In-Depth Look at Historical Patent and Trademark Damages Trends*, IPL NEWSL., Spring 2002, at 6, 9, WL 20 No. 3 Intell. Prop. L. Newsl. 6. The median damage award was only \$2.4 million, however. *Id.*

⁷⁴ *Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy: Fed. Trade Comm'n Roundtable* 127 (Oct. 30, 2002) [hereinafter *FTC Transcript*, 10/30/02] (statement of Mark T. Banner), available at <http://www.ftc.gov/opp/intellect/021030trans.pdf>.

⁷⁵ See Lee & Cogswell, *supra* note 67, at 448–49; Lemley & Tangri, *supra* note 36, at 1100–02; Sterne & Cornwell, *supra* note 67, at 251–52.

⁷⁶ *Underwater Devices Inc. v. Morrison-Knudsen Co.*, 717 F.2d 1380, 1390 (Fed. Cir. 1983); see also *Smith Eng'g Co. v. Eisenmann Corp.*, No. 01-1202, 2002 WL 70440, at *6 (Fed. Cir. Jan. 17, 2002) (finding “a textbook example of willful infringement” when the defendant relied on its engi-

and often over \$100,000, apiece.⁷⁷ For someone deliberately attempting to design around particular patents, obtaining opinion letters will almost always be worth the cost. Similarly, in industries like pharmaceuticals, organic chemicals, and biotechnology, where patents typically cover a relatively specific chemical structure or genetic sequence,⁷⁸ it is possible that inventors can reliably identify patents they might be infringing, making it easier to pick out patents that need an opinion letter. In many industries, however, such as computers and software, identifying patents that pose an infringement problem can be incredibly difficult.⁷⁹ Because an innovator might come across thousands of patents while searching the patent database, and because there is a “strong yet economically inefficient incentive to . . . obtain[] legal advice on all patents of which he has actual notice,” there arises “a perverse incentive for potential infringers not to become ‘too aware’” of the patents held by other entities.⁸⁰

While this dilemma could be avoided by an appropriate screening mechanism, engineers and in-house counsel cannot effectively shield their employers from the willfulness rules. For example, a company might ask its engineers to look for infringement problems whenever they read a patent and to obtain opinion letters for only those that appear to pose a risk. Many of the most problematic patents would slip through such a filter, however. Engineers are likely to evaluate the patent based on the specific embodiments listed in its written description, which often appear much narrower than the actual scope of the claims.⁸¹ As a result, an engineer might stumble across a patent in which the specific embodiments bear little resemblance to her company’s products and never notice that the claims in the patent pose a serious infringement question.⁸² In-house patent attorneys sometimes fare no better at spotting potential infringement issues,⁸³ which is not

neering department rather than “consult[ing] legal counsel in evaluating the risk of patent infringement”).

⁷⁷ See Powers & Carlson, *supra* note 62, at 102. Moreover, when defendants produce exculpatory opinion letters at trial, they must waive at least some portion of their attorney-client privilege. See Lemley & Tangri, *supra* note 36, at 1105–06. This has spawned “a cottage industry of window-dressing legal opinions by third party counsel designed to protect the real decision-making process between litigating counsel and the company’s executives.” Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp., 383 F.3d 1337, 1351 (Fed. Cir. 2004) (Dyk, J., concurring in part and dissenting in part).

⁷⁸ See Scherer, *supra* note 47, at 1351–52.

⁷⁹ See FTC REPORT, *supra* note 53, ch. 3, at 39–40, 53.

⁸⁰ Lee & Cogswell, *supra* note 67, at 448–49; see also Lemley & Tangri, *supra* note 36, at 1100–02.

⁸¹ See Lee & Cogswell, *supra* note 67, at 448.

⁸² See *id.* For a description by one executive explaining how his company trains engineers to read patents, see *FTC Transcript*, 10/30/02, *supra* note 74, at 82 (statement of Ronald E. Myrick).

⁸³ See, e.g., *FTC Transcript*, 10/30/02, *supra* note 74, at 133–34 (statement of Gerald Moshinghoff) (“I was personally involved in several cases where willfulness was alleged[,] . . . and there’s a

surprising considering that the Federal Circuit reverses between forty and fifty percent of the district court claim construction rulings that it hears on appeal.⁸⁴ Companies are well aware that “[p]atents are notoriously hard to interpret, and the outcome of patent litigation is equally difficult to predict.”⁸⁵ As one executive explained, “the idea that we can identify patents that are problematic” is “even worse than impractical; it’s impossible.”⁸⁶

Innovators must evaluate these significant financial risks in light of the potential benefits to be gained by reading through various patent disclosures. In most cases, there will be little upside to searching blindly through the patent files for new ideas and innovations. As discussed in section II.A, most inventions are disclosed to the public through channels other than the patent system, and innovators are therefore unlikely to encounter many new ideas or technologies in the records. Additionally, as is discussed below in section II.C, many of the most valuable patents contain incomplete disclosures or are withheld from publication until the patent issues.

The risk of unintentionally walking into an infringement suit may provide a more powerful incentive for innovators to read the outstanding patents in their field. As one executive explained, at his company “every product that gets sent out the door gets checked” because “the cost of ignorance is too high.”⁸⁷ To the extent that innovators are reading patents only to perform clearance searches for new products, however, the patent system is not causing R&D spillovers or reducing duplicative research, which undermines two of the three economic benefits expected from patent disclosures. Moreover, because it is so difficult to interpret patents and predict the outcome of an infringement suit,⁸⁸ these clearance searches may not significantly reduce unnecessary litigation and allow for efficient investment in innovation, which raises questions about the third expected benefit. That uncertainty also diminishes the value of reading patents and may explain why in industries in which patents are particularly hard to interpret, it

real dilemma on the part of the alleged infringer where a host of patents are called to the infringer’s attention, and they have a patent attorney who looks at it, and they say, well, this obviously doesn’t [cover our product]. That may be precisely the one that causes the problem.”)

⁸⁴ See Mark T. Banner, *Keeping Current with the Chair*, IPL NEWSL., Summer 2003, at 2, 2, 13, available at http://www.abanet.org/intelprop/bulletin/summer_03.pdf.

⁸⁵ Powers & Carlson, *supra* note 62, at 102–03.

⁸⁶ *FTC Transcript*, 10/30/02, *supra* note 74, at 79 (statement of Robert Barr).

⁸⁷ *Id.* at 82–83 (statement of Ronald E. Myrick).

⁸⁸ See *infra* section II.C, pp. 2023–26.

appears that very few companies actually perform these clearance searches.⁸⁹

Given the low expected benefits and the high expected costs of investigating patent applications, it is no surprise that many innovators follow a strategy of “willful ignorance” with respect to the patents in their field.⁹⁰ Some lawyers advise their clients not to read patents except when absolutely necessary.⁹¹ Based on this evidence, the FTC, after nine months of hearings on patent law policy, warned in its final report that “fear of willfulness charges works to undermine the patent system’s disclosure goals by discouraging third parties from reading patents.”⁹² As one commentator explained, “from the perspective of a potential infringer, ignorance is bliss.”⁹³

C. The Third Assumption: Innovators Can Find Valuable Information in the Patent Records

In addition to the problems discussed above, it appears that patent disclosures and the patent database as a whole are poor media for communicating technical information to engineers, reducing even further the disclosure value of patents. This might come as a surprise to Congress, which drafted the Patent Act to require that applicants provide “a written description of the invention . . . in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use [it].”⁹⁴ Yet business executives report a number of reasons why patent disclosures are very rarely a useful source of information for research and development. First, there are loopholes in the publication laws that allow patent applicants to postpone disclosing their filings. Second, despite the statutory en-

⁸⁹ See *FTC Transcript*, 10/30/02, *supra* note 74, at 81 (statement of Robert Barr) (“I used to say only IBM does clearance searches — maybe GE does now, I’d be interested in hearing about that — but IBM tells me even they don’t do clearance searches anymore.”).

⁹⁰ Lee & Cogswell, *supra* note 67, at 449; see, e.g., Jonathan T. Kaplan, *Viewpoint: Patent Disclosure Policy and Willful Infringement Doctrine*, PAT. STRATEGY & MGMT., July 2003, at 6 (arguing that the willful infringement rules are the reason that “[s]cientists and engineers seldom, if ever, consult patents in the course of their work”); Lemley & Tangri, *supra* note 36, at 1100–01 (arguing that the willful infringement rules “discourage engineers and companies from reading a competitor’s patents at all”); Sterne & Cornwell, *supra* note 67, at 251–52 (“Because of th[e] willfulness] threat, many innovators, especially smaller ones, deliberately do not investigate the patents of their competitors”); Edwin H. Taylor & Glenn E. Von Tersch, *A Proposal To Shore Up the Foundations of Patent Law That the Underwater Line Eroded*, 20 HASTINGS COMM. & ENT. L.J. 721, 737 (1998) (noting that because of the willful infringement rules, “many companies discourage employees from reading patents”).

⁹¹ See, e.g., *FTC Transcript*, 2/27/02, *supra* note 61, at 420 (statement of Jordan Greenhall); Dennis Fernandez, *Move Over Letterman: Top 10 Most Common IP Management Mistakes for New Companies*, PAT. STRATEGY & MGMT., July 2003, at 3.

⁹² FTC REPORT, *supra* note 53, ch. 5, at 28–31.

⁹³ Lemley & Tangri, *supra* note 36, at 1101.

⁹⁴ 35 U.S.C. § 112 (2000).

ablement requirements, many applicants deliberately fail to disclose the trade secrets and know-how necessary to recreate or use the invention efficiently. Third, in response to some of the courts' claim construction rules, the written descriptions are often drafted in ways that make them tedious or difficult for engineers to understand.

1. *Delayed Disclosure.* — The publication law contains a loophole that allows for extensive delays in the disclosure process, a method popular with inventors who could benefit from the use of trade secrecy but choose patent protection instead. Although the majority of U.S. patent applications are made public eighteen months after filing,⁹⁵ Congress has allowed patent applicants to postpone publishing until their patent finally issues, so long as they agree to file for patent protection only in the United States.⁹⁶ Because it can take years for a patent to finally issue,⁹⁷ especially when the patent applicant is deliberately drawing out the process, this is an appealing option for many applicants. In 2002, eleven percent of U.S. patent applicants opted for secrecy instead of the right to file in foreign countries.⁹⁸ Not surprisingly, withholding is most common in industries with the shortest product cycles, which means that the delay in publication can completely deprive the public of the value of the disclosure.⁹⁹

2. *Inadequate Disclosure.* — Once patent applications are published, some applicants still withhold crucial information from their disclosures, which diminishes their value to the public. In theory, an inventor cannot use both trade secrecy and patent law to protect his invention, but “must content himself with either secrecy, or legal monopoly.”¹⁰⁰ Consequently, courts require patent applications to “provide a disclosure sufficient to enable one skilled in the art to carry out the invention.”¹⁰¹ Despite these disclosure requirements, however, “oftentimes, valuable trade secret information is not included in a patent granted and . . . there is a certain amount of know-how, show-how and other types of information available [only through] frequent consultation with the inventors.”¹⁰² As the CEO of a consulting firm specializing in intellectual property licensing explained:

⁹⁵ See *id.* § 122.

⁹⁶ See *id.* § 122(b)(2)(B); NAT'L RESEARCH COUNCIL, *supra* note 7, at 64.

⁹⁷ MERGES & DUFFY, *supra* note 14, at 49–51.

⁹⁸ See NAT'L RESEARCH COUNCIL, *supra* note 7, at 64.

⁹⁹ See *id.* at 97.

¹⁰⁰ *Metallizing Eng'g Co. v. Kenyon Bearing & Auto Parts Co.*, 153 F.2d 516, 520 (2d Cir.), *cert. denied*, 328 U.S. 840 (1946).

¹⁰¹ *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1213 (Fed. Cir. 1991).

¹⁰² *Hamilton & Beaumont*, *supra* note 47, § 1.01[3]. This phenomenon may be particularly common for patents in software (for which the source code does not need to be disclosed), computer hardware, and business methods. Cf. FTC REPORT, *supra* note 53, ch. 3, at 33; Toren, *supra* note 51.

[I]n spite of what the Constitution tells us and the body of law teaches us, the fact is that patents seldom teach enough so that someone can actually go out and actually do the invention without some additional work.

. . . [W]hat happens in modern licensing practice is that increasingly[,] companies will actually license know-how, that is, trade secret[s] and patents¹⁰³

Many patented inventions cannot be recreated or put into use based on the information contained in the patent itself, so someone wishing to use the invention must license the patent and corresponding trade secrets. This practice calls into question the extent to which patent disclosures can produce R&D spillovers.

3. *Opaque Disclosure.* — Although patent applicants are supposed to provide a “full, clear, [and] concise” written description of their invention so that their peers in the industry can easily read and understand it,¹⁰⁴ very few patents today meet that standard. Instead, the goals of clarity and brevity take a back seat to drafting strategies meant to ensure that patents are interpreted broadly by the courts. As a result of these strategies, engineers often find it difficult to extract useful information from the written description, which further weakens the disclosure value of patents.

While patent specifications are ostensibly written for the benefit of those “skilled in the art,” most engineers actually find reading them, as one author put it, “an uncomfortable experience, [where] the document seems to be unreasonably repetitive and in parts almost incomprehensible.”¹⁰⁵ Some even report that because patents are so difficult to decipher, engineers simply do not read them.¹⁰⁶ Although the strength of this observation likely depends on the industry in question,¹⁰⁷ most industry officials appear to agree that patents are a poor medium for communicating technical information.¹⁰⁸

¹⁰³ *FTC Transcript*, 3/20/02, *supra* note 52, at 53 (statement of Daniel McCurdy); *see also* Toren, *supra* note 51 (noting that it is not uncommon for “patent protection [to] be sought for the invention and related information [to] be protected as trade secrets[,] . . . permit[ting] companies to have their cake and eat it too”).

¹⁰⁴ 35 U.S.C. § 112 (2000).

¹⁰⁵ Vivien Irish, *How To Read a Patent Specification*, 10 *ENG’G MGMT. J.* 71, 71 (2000), *available at* <http://www.bl.uk/pdf/patspec.pdf>.

¹⁰⁶ *FTC Transcript*, 10/30/02, *supra* note 74, at 79 (statement of Robert Barr) (“[E]ngineers don’t read patents. They find them hard to read. They find it hard to locate patents of interest.”). *But see id.* at 83 (statement of Ronald E. Myrick) (“As far as [our] engineers reading patents, they certainly do. . . . They don’t read them, you know, just for bedtime reading, but it’s part of the job.”).

¹⁰⁷ *See* *FTC REPORT*, *supra* note 53, ch. 3, at 18, 49 (noting that patent disclosures appear useful in the pharmaceutical industry, but not in software).

¹⁰⁸ *See, e.g.*, NAT’L RESEARCH COUNCIL, *supra* note 7, at 63 (noting that “patents [are] a less than ideal vehicle for communicating technical information,” partly because “a patent is written by an attorney or a patent agent to persuade an examiner to grant and a court to uphold a property right of the desired scope”).

The rules courts use to interpret patents and determine their breadth create incentives for patent applicants to draft their disclosures opaquely. Whereas patent applicants often withhold trade secrets from their specifications, creating a problem of too little useful disclosure, they simultaneously disclose too much information of insignificant value in an attempt to prevent courts from narrowing the scope of their patents. On the one hand, if the written description provides a straightforward characterization of the overall invention, that description can be used to narrow the scope of the patent.¹⁰⁹ On the other hand, if the written description is condensed into a single, specific embodiment of the invention, it can also be used to narrow the scope of the patent.¹¹⁰

Although these rules discourage applicants from filing incomplete disclosures or drafting overly broad claims, they have the unintended effect of penalizing patentees who wish to file a single, concise description of the overall invention or its best mode. Consequently, articles on claim drafting typically advise that, “instead of lumping multiple features of the invention in a single drawing . . . , the drafter should envision as many characterizations . . . of the invention as practicable” and describe “as many variations as possible.”¹¹¹ Drafting techniques such as these, where the patentee avoids concise descriptions and illustrations in favor of providing “as many variations [of the invention] as possible,” help to explain why engineers complain that patents are “unreasonably repetitive and in parts almost incomprehensible,”¹¹² and why they avoid reading them.

CONCLUSION

If the Supreme Court is correct that “the ultimate goal” of patent law is to facilitate the disclosure of information that would otherwise

¹⁰⁹ See, e.g., *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1345 (Fed. Cir. 2001).

¹¹⁰ See, e.g., *Toro Co. v. White Consol. Ind.*, 199 F.3d 1295, 1301–02 (Fed. Cir. 1999). Additionally, courts can use the single embodiment to reinterpret and narrow the claim language. See, e.g., *SciMed*, 242 F.3d at 1340–45. This matter is currently under review by the Federal Circuit. See *Phillips v. AWH Corp.*, No. 03-1269, slip op. at 2 (Fed. Cir. July 21, 2004) (order granting rehearing en banc). In either case, courts may prohibit the patentee from making any correcting amendments broadening the scope of the claims, which is important because applicants often try to amend their claims during prosecution to prevent their competitors from designing around the patent. See, e.g., *Gentry Gallery, Inc. v. Berklinc Corp.*, 134 F.3d 1473, 1479 (Fed. Cir. 1998).

¹¹¹ Robert Greene Sterne et al., *The Written Description Requirement*, 37 AKRON L. REV. 231, 239 (2004); see also George F. Wheeler, *Creative Claim Drafting: Claim Drafting Strategies, Specification Preparation, and Prosecution Tactics*, 3 J. MARSHALL REV. INTELL. PROP. L. 34, 43 (2003) (“[C]onvey in your specification that there are many ways to carry out the invention. Challenge the inventors to conceive several different embodiments of the invention, with many different features. Describe more than one embodiment when you can do so.”).

¹¹² Irish, *supra* note 105, at 71.

be kept secret,¹¹³ then our patent system appears to be in trouble. A number of empirical studies suggest that patent disclosures play an insignificant role in promoting R&D spillovers. This is partially a reflection of the basic economics of patenting, where companies typically patent only those inventions that are disclosed to the public through other channels. It also reflects the numerous alternative sources of information available to inventors. Both of these issues are largely inherent in the patent system.

Many of the other problems discussed in this Note are more amenable to repair, assuming the courts and policymakers genuinely wish to improve the disclosure value of patents. The Federal Circuit's willful infringement rules, for example, encourage innovators to protect themselves from treble damages by remaining "willfully ignorant" of the patents in their field. Many commentators have recommended abolishing the willfulness rules entirely,¹¹⁴ although the Federal Circuit appears wedded to the doctrine.¹¹⁵ Similarly, commentators have suggested that Congress remove the remaining loopholes in the publication rules for patent applications, which currently allow some of the most time-sensitive innovations to be both patented and withheld from the public.¹¹⁶ In industries where patent applications are thought to disclose too little knowledge, courts might require more detailed information about how to enable the claimed invention. In the software industry, for example, there might be a strong case for requiring patent applicants to disclose the source code of their program.¹¹⁷ Congress or the Federal Circuit might make it easier for engineers to read patents by demanding that patent applicants provide a summary section within their written description that reads more like a journal article than a patent.¹¹⁸ Finally, at a more fundamental level, the Federal Circuit must address the unpredictability of patent litigation, which underlies the problems caused by the willful infringement rules.

Even given the current structural limitations, however, the patent system still serves a limited disclosure function by allowing inventors to discuss and publicize their research freely.¹¹⁹ As one industry executive explained, "an awful lot of the information transfer [might happen] in the scientific literature . . . , but quite a bit of the scientific lit-

¹¹³ *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150-51 (1989).

¹¹⁴ See, e.g., Lemley & Tangri, *supra* note 36, 1100-02.

¹¹⁵ See *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337, 1345 (Fed. Cir. 2004) (en banc) (reaffirming the "affirmative duty" doctrine).

¹¹⁶ See NAT'L RESEARCH COUNCIL, *supra* note 7, at 64.

¹¹⁷ See FTC REPORT, *supra* note 53, ch. 3, at 49.

¹¹⁸ Of course, the courts would have to agree not to use that section of the disclosure when interpreting claim language.

¹¹⁹ See FTC REPORT, *supra* note 53, at 18; NAT'L RESEARCH COUNCIL, *supra* note 7, at 36-37.

erature is enabled by the fact that there's been a patent filed."¹²⁰ In the pharmaceutical or biotechnology industries, employees wishing to publish their research in the literature appear to exert some force on the companies' patenting policies. Thus, attorneys for the industry have advised that "primary reliance upon patent protection may be advisable [for companies] as a matter of policy in order to attract and maintain scientific talent by providing assurance that research results may be published."¹²¹

On the other hand, commentators may have overstated claims about the importance of patents in enabling other flows of information, or the wisdom of relying on voluntary disclosure in the patent system. For example, the cultural norm of publishing research results may be less prevalent outside of the pharmaceutical and biotechnology industries. Additionally, although a survey of U.S. companies confirms that patent disclosures are much less important than publications and informal exchanges as a channel for R&D spillovers, it also shows no significant correlation between the rate of patenting in an industry and the disclosure of information through publications or informal exchanges.¹²² Moreover, by relying on publications and other voluntary channels of information sharing, the patent system essentially makes disclosure optional, which suggests that some of the most valuable information will remain secret. It is therefore unclear whether a system of voluntary disclosure is the best policy of disseminating information, or whether the patent system significantly encourages the voluntary information sharing in industries other than pharmaceuticals and biotechnology.

In the end, it is possible that disclosure will remain an elusive goal for the patent system. Policymakers and courts should recognize that the primary justification for the patent system is to offer incentives to create, develop, and commercialize new technologies and innovations, not to encourage their disclosure to the public. Any policy that sacrifices the former goal in the name of the latter, such as the written description requirement and the no prior use defense, will ultimately harm the public.

¹²⁰ *Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy: Fed. Trade Comm'n Workshop* 319 (Feb. 26, 2002) (statement of Robert Blackburn), available at <http://www.ftc.gov/opp/intellect/020226trans.pdf>; see also *Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy: Hearing Before the Fed. Trade Comm'n* 177 (Oct. 25, 2002) (statement of Scott Chambers), available at <http://www.ftc.gov/opp/intellect/021025trans.pdf>.

¹²¹ Hamilton & Beaumont, *supra* note 47, § 1.10.

¹²² See Cohen et al., *supra* note 42, at 1362–64 & n.34.