

STRICT LIABILITY AND ITS ALTERNATIVES IN PATENT LAW

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ABSTRACT

In this Article, Professors Blair and Cotter pose two questions. First, is the U.S. patent system really a regime of strict liability, as it is often said to be? Second, however the current regime might be described, is it the best of all possible alternatives? In answer to the first question, Blair and Cotter argue that patent law is best conceived of as a modified strict liability system, in which the defendant's liability often depends upon the defendant's receipt of actual or constructive notice of the patent. In answer to the second question, Blair and Cotter examine a variety of alternatives, including an intent-based system, a negligence system, and a pure strict liability system. They conclude that a system of modified strict liability may be the best choice among imperfect alternatives, but that lawmakers should consider altering the patent marking statute, 35 U.S.C. § 287, in some respects.

I. INTRODUCTION

Patent infringement is often characterized as a strict liability tort,¹ and in some ways it is. But it is not strict liability in the purest sense, or at least not in the sense in which the term is used in general tort law. Strict liability is typically (although not entirely accurately) defined as liability without fault.² Strict liability can arise in a variety of common tort law settings,

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1. *See, e.g.*, *Jurgens v. CBK, Ltd.*, 80 F.3d 1566, 1570 n.2 (Fed. Cir. 1996) (citing *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1527 (Fed. Cir. 1995) (en banc), *rev'd on other grounds*, 520 U.S. 17 (1997)).

2. *See, e.g.*, RESTATEMENT (SECOND) OF TORTS §§ 504-524A (1977). As others have recognized, however, describing strict liability as liability without fault can be mis-

such as when a person engages in unusually dangerous activity³ or when a manufacturer distributes a defective product.⁴ In the latter instance, a court may require the defendant to pay damages for injuries caused by the defective product, even if the defendant was unaware of the defect prior to the injury.⁵ We suspect that when people use the term “strict liability,” they tend to think of situations in which the defendant is liable for past injuries bearing some causal relationship to her conduct, even though that conduct may not embody actionable negligence, much less an intentional tort.

Patent law is consistent with this model only in part. Patent infringement is a strict liability tort in the sense that a defendant may be liable without having had any notice, prior to the filing of an infringement action, that her conduct was infringing.⁶ In other words, innocent (i.e., unintentional or inadvertent) infringement is not a defense to a patent infringement claim,⁷ and a court usually will enjoin the defendant from infringing even though she was put on notice only by the filing of the lawsuit.⁸ In contrast to the common tort law situation, however, the defendant in a patent infringement suit is often not liable for *damages* until the plaintiff puts her on notice; at that point, she becomes liable only for damages

leading because many of the factors that are relevant to a determination of negligence are equally relevant to a determination of strict liability. *See, e.g.,* Flaminio v. Honda Motor Co., 733 F.2d 463, 466-67 (7th Cir. 1984).

3. *See* RESTATEMENT (SECOND) OF TORTS § 519 (1977).

4. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 (1998).

5. *See id.* §§ 1-2 illus. 1.

6. *See, e.g.,* Grain Processing Corp. v. Am. Maize-Prods. Co., 185 F.3d 1341, 1345-47 & n.3 (Fed. Cir. 1999) (noting earlier proceedings that had resulted in the entry of an injunction against the defendant, despite the fact that the defendant received neither actual nor constructive notice of its infringement until the service of the complaint and therefore was not liable for damages accruing before that date); *Am. Med. Sys. v. Med. Eng'g Corp.*, 6 F.3d 1523, 1526-29, 1534-39 (Fed. Cir. 1993) (affirming that portion of the judgment that permanently enjoined the defendant from infringing the '765 patent, despite the fact that the defendant was not put on constructive notice of its infringement until three months after it began infringing); 7 DONALD S. CHISUM, CHISUM ON PATENTS § 20.03[7][c][vi] (2001) (noting that a patent owner who fails to provide actual or constructive notice may nevertheless obtain injunctive relief against further infringement).

7. Compare this with copyright law, in which independent discovery (though not unconscious copying) is a valid defense. For further elaboration of this point, see *infra* notes 27-35 and accompanying text.

8. *See supra* note 6; *see also* 7 CHISUM, *supra* note 6, § 20.04[2] (stating that the prevailing patent owner “will usually be granted a permanent injunction against future infringement unless the public interest otherwise dictates”).

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arising from her subsequent conduct.⁹ Section 287(a) of the Patent Act states:

Patentees, and persons making, offering for sale, or selling within the United States any patented article for or under them, or importing any patented article into the United States, may give notice to the public that the same is patented, either by fixing thereon the word “patent” or the abbreviation “pat.,” together with the number of the patent, or when, from the character of the article, this can not be done, by fixing to it, or to the package wherein one or more of them is contained, a label containing a like notice. In the event of failure so to mark, no damages shall be recovered by the patentee in any action for infringement, except on proof that the infringer was notified of the infringement and continued to infringe thereafter, in which event damages may be recovered only for infringement occurring after such notice. Filing of an action for infringement shall constitute such notice.¹⁰

9. See 35 U.S.C. § 287 (1994).

10. *Id.* The Federal Circuit summarized the history of the marking requirement in *Nike, Inc. v. Wal-Mart Stores, Inc.*, 138 F.3d 1437, 1443 (Fed. Cir. 1998):

The early patent statutes contained no marking requirement. As explained in *Boyden v. Burke*, 55 U.S. (14 How.) 575, 582-83, 14 L.Ed. 548 (1852), patents were public records and all persons were “bound to take notice of their contents.” A duty to mark was imposed by the Patent Act of 1842, which required “all patentees and assignees of patents . . . to stamp . . . on each article vended, or offered for sale, the date of the patent.” Act of 1842, 5 Stat. 543, 544. If the patentee failed to mark each article, the penalty was a fine of “not less than one hundred dollars.” *Id.* In 1861 the statute was amended to delete the statutory penalty, and instead to place a limitation on the patentee’s right to recover for infringement. The Patent Act of 1861, 12 Stat. 246, 249, provided that “no damage shall be recovered by the plaintiff” unless that person marked the article as patented or the infringer received actual notice of the patent.

The marking provision has not been substantially changed since 1861.

Id. The last sentence quoted above is a slight overstatement. *Cf.* *Am. Med. Sys. v. Med. Eng’g Corp.*, 6 F.3d 1523, 1535-37 (Fed. Cir. 1993) (noting that, under the current statute, marking is no longer described as a “duty” and holding that a patent owner therefore may recover damages for infringing acts occurring after he complies with section 287; and rejecting case law, decided under earlier versions of the statute, precluding patent owners from recovering any damages if they failed to mark their products *immediately* upon issuance of the patent). Nevertheless, courts sometimes look to case law decided under earlier versions of the statute as persuasive authority, at least with respect to those portions of the current statute that are substantially similar to the preceding versions. *See*,

Thus, a patentee who markets products embodying his patent can recover damages only for infringing conduct that occurs after he has provided the requisite notice by: (1) commencing an infringement action against the defendant;¹¹ (2) providing actual, specific notice of the in-

e.g., *Amsted Indus. v. Buckeye Steel Castings Co.*, 24 F.3d 178, 186-87 & nn.3-4 (Fed. Cir. 1994).

11. *See* 35 U.S.C. § 287(a) (1994) (stating that “[f]iling of an action for infringement shall constitute such notice”). For purposes of completeness, we should note that there are two other circumstances in which the Patent Act departs from the strict liability model. The first relates to a person who uses, sells, offers to sell, or imports into the United States an unpatented product made by a process that is patented in the United States. Section 271(g) of the Patent Act states that these activities constitute infringement, but that: (1) “no remedy may be granted for infringement on account of the noncommercial use or retail sale of a product unless there is no adequate remedy under this title for infringement on account of the importation or other use, offer to sell, or sale of that product;” and (2) a product made by a patented process will not be considered so made after “it is materially changed by subsequent processes; or . . . it becomes a trivial and nonessential component of another product.” *Id.* § 271(g). Section 287(b)(1) of the Patent Act then provides, *inter alia*, that a person who infringes by using, selling, offering to sell, or importing the unpatented product of a patented process may be liable for damages if she “(A) practiced the patented process; (B) owns or controls, or is owned or controlled by, the person who practiced the patented process; or (C) had knowledge before the infringement that a patented process was used to make the product . . .” *Id.* § 287(b)(1). Otherwise, “[n]o remedies for infringement under section 271(g) . . . shall be available with respect to any product in the possession of, or in transit to, the person subject to liability under such section before that person had notice of infringement with respect to that product.” *Id.* § 287(b)(2). The statute goes on to specify that “notice of infringement” shall mean “actual knowledge, or receipt by a person of a written notification, or a combination thereof, of information sufficient to persuade a reasonable person that it is likely that a product was made by a process patented in the United States.” *Id.* § 287(b)(5)(A); *see also id.* § 287(b)(5)(C)-(D) (further defining acts which constitute notice of infringement for purposes of this subsection); *id.* § 287(b)(4)(C) (effectively providing that marking the unpatented products of a patented process with the process patent number constitutes constructive notice of the process patent for purposes of this subsection). Section 287 also prescribes that the defendant may show her good faith by requesting relevant information from *a* manufacturer of the product, and disclosing that information to *her* manufacturer or supplier, before first importing, using, offering for sale, or selling units of the product and before having notice of infringement with respect to the product. *See id.* §§ 287(b)(3)-(4). Thus, with respect to acts of infringement consisting of the unauthorized importation, use, sale, or offer to sell of unpatented products of a patented process, the defendant may be liable for damages if she has actual knowledge, actual notice, or constructive notice prior to her infringement. *Id.* § 287.

Second, the Patent Act now provides for the publication of pending patent applications eighteen months after filing, subject to certain exceptions. *See id.* § 122(b). A person who makes, uses, sells, offers to sell, or imports into the United States the invention claimed in a published application may be liable for a reasonable royalty for the period of time from the publication to the date on which the patent issues, but only if she has “actual notice of the published patent application.” *See id.* § 154(d)(1). Although the

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fringement, prior to the filing of the lawsuit;¹² or (3) providing constructive notice by affixation, as set forth in section 287(a).¹³ One therefore might conclude that the Patent Act makes the recovery of damages contingent upon the defendant's *intentional* decision to infringe after having received notice, and that this outcome is considerably different from the common meaning of strict liability.¹⁴ Indeed, the Federal Circuit has sug-

statute does not define what constitutes "actual notice of the published patent application," one commentator argues that the defendant must be "informed (1) by the patentee, (2) of the identity of the patent application serial number, (3) of the activity that is believed to be within the scope of the published claims, and (4) of a proposal to abate the provisional 'infringement.'" Philippe Signore, *The New Provisional Rights Provision*, 82 J. PAT. & TRADEMARK OFF. SOC'Y 742, 748-49 (2000).

12. *See, e.g., SRI Int'l, Inc. v. Advanced Tech. Labs., Inc.*, 127 F.3d 1462, 1470 (Fed. Cir. 1997):

It is not controlling whether the patentee threatens suit, demands cessation of infringement, or offers a license under the patent. Although there are numerous possible variations in form and content, the purpose of the actual notice requirement is met when the recipient is notified, with sufficient specificity, that the patent holder believes that the recipient of the notice may be an infringer. Thus, the actual notice requirement of § 287(a) is satisfied when the recipient is informed of the identity of the patent and the activity that is believed to be an infringement, accompanied by a proposal to abate the infringement, whether by license or otherwise.

Id. (citation omitted); *see also Gart v. Logitech, Inc.*, 254 F.3d 1334, 1345-46 (Fed. Cir. 2001) (stating that "mere 'notice of the patent's existence or ownership' is not 'notice of the infringement,'" and that section 287(a) requires an "'affirmative communication [to the alleged infringer] of a specific charge of infringement by a specific accused product or device,'" although the latter need not constitute an "'unqualified charge of infringement'" (quoting *Amsted Indus.*, 24 F.3d at 187; *SRI Int'l*, 127 F.3d at 1470); *Lans v. Digital Equip. Corp.*, 252 F.3d 1320, 1326-27 (Fed. Cir. 2001) (holding that notification must come from, and identify, the patentee, and that notice even from one "closely associated with the patentee" is therefore insufficient); *Amsted Indus.*, 24 F.3d at 187 (holding that actual notice "requires the affirmative communication of a specific charge of infringement by a specific accused product," and that the defendant's actual knowledge of the patent or its own infringement is irrelevant).

13. *See* 35 U.S.C. § 287(a) (1994).

14. Learned Hand once made an analogous observation with respect to the way in which he thought liability should operate in copyright law. *See DeAcosta v. Brown*, 146 F.2d 408, 414 (2d Cir. 1944) (Hand, J., dissenting) (arguing that a magazine publisher that innocently publishes an article that infringes another copyrighted work should be enjoined, "[a]s soon as [he] learns that his original was a copy," and should be liable in restitution, but not for pre-notice compensatory damages). In the *DeAcosta* case itself, however, the majority held that the publisher was liable even for the latter class of damages. *See id.* at 410-12; *see also Lipton v. Nature Co.*, 71 F.3d 464, 471 (2d Cir. 1995) (holding that one who copies another's copyrighted work, as embodied unlawfully in an intermediate product, is liable to the copyright holder).

gested as much, stating that section 287 “serves three related purposes: (1) helping to avoid innocent infringement; (2) encouraging patentees to give notice to the public that the article is patented; and (3) aiding the public to identify whether an article is patented.”¹⁵

The preceding discussion overstates our case, however, in at least two respects. First, a patent owner who does not market any products that embody his patent may recover damages for infringing conduct that occurs prior to the defendant’s receipt of notice. Thus, the owner of an infringed *process* patent may be able to recover damages accruing from the beginning of the infringement, regardless of whether the defendant is on notice or has knowledge of the patent prior to the service of the complaint.¹⁶

15. *Nike*, 138 F.3d at 1443; *see also Lans*, 252 F.3d at 1327. In *Lans*, the court noted:

Besides alerting the alleged infringer to avoid further infringement, the notice requirement also permits the alleged infringer to contact the patentee about an amicable and early resolution of the potential dispute. Thus, without knowledge of the patentee’s identity, an alleged infringer may lose the benefit of this primary purpose of the notice requirement. An alleged infringer may lose the opportunity to consult with the patentee about design changes to avoid infringement. Similarly, without knowledge of the patentee, an alleged infringer may lose the chance to negotiate a valid license. In sum, knowledge of the patentee’s identity facilitates avoidance of infringement with design changes, negotiations for licenses, and even early resolution of rights in a declaratory judgment proceeding.

Id.

16. *See* *Crystal Semiconductor Corp. v. Tritech Microelectronics Int’l, Inc.*, 246 F.3d 1336, 1353 (Fed. Cir. 2001) (citing *Am. Med. Sys.*, 6 F.3d at 1538); *Bandag, Inc. v. Gerrard Tire Co.*, 704 F.2d 1578, 1581 (Fed. Cir. 1983). The rationale for not requiring marking in the case of process patents is that processes cannot be marked. *See Am. Med. Sys.*, 6 F.3d at 1538. Patent law nevertheless could restrict the process patent owner from recovering damages attributable to “innocent” infringement—or else provide for some other form of constructive notice of a process patent—but at present it does not. *See infra* notes 111-113 and accompanying text.

When the patent contains both product and process claims, however, the patent owner’s failure to mark his patented products sometimes may prevent him from recovering damages attributable to the pre-notice infringement of either type of claim. For example, in *American Medical Systems*, the patent contained, and the patent owner asserted claims for the infringement of, both product claims (relating to a prosthesis) and process claims (relating to the manufacture and sterilization of the prosthesis); the patent owner had shipped almost 2,000 patented prostheses before it began marking those products. *See Am. Med. Sys.*, 6 F.3d at 1527-28, 1529, 1534-35. The Federal Circuit held that the patent owner could not recover damages attributable to the infringement of either the product or process claims, for the period of time preceding the defendant’s receipt of actual or constructive notice. *See id.* at 1537-39. With respect to the process claims in particular, the court stated:

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Similarly, the owner of an idle patent may recover damages for conduct occurring prior to the receipt of notice,¹⁷ although typically these damages will take the form of a reasonable royalty, rather than lost profits.¹⁸ In

Where the patent contains both apparatus and method claims . . . to the extent that there is a tangible item to mark by which notice of the asserted method claims can be given, a party is obliged to do so if it intends to avail itself of the constructive notice provisions of section 287(a).

In this case, both apparatus and method claims of the '765 patent were asserted and there was a physical device produced by the claimed method that was capable of being marked. Therefore, we conclude that AMS was required to mark its product pursuant to section 287(a) in order to recover damages under its method claims prior to actual or constructive notice being given to [the defendant].

Id. at 1538-39. *American Medical Systems* nevertheless leaves several questions unanswered. What if, for example, the patent contains both product and process claims, the patentee sells unmarked articles embodying the product claims, but he alleges the infringement of only the process claims? What if he alleges infringement of both types of claims, but prevails only on the process claims? Earlier decisions of the Federal Circuit point in opposite directions. *Compare* *Devices for Medicine, Inc. v. Boehl*, 822 F.2d 1062, 1066 (Fed. Cir. 1987) (arguably standing for the proposition that the patent owner may recover for the infringement of the process claims if the complaint alleges infringement of only the process claims, but not if it alleges infringement of both product and process claims), *with* *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1083 (Fed. Cir. 1983) (arguably standing for the proposition that the patent owner may recover for the infringement of the process claims if the patent owner prevails upon only those claims at trial; the opinion is unclear, however, as to whether the complaint alleged the infringement of the product claims as well); *see also* Joel Voelzke, *Patent Marking Under 35 U.S.C. § 287(a): Products, Processes, and the Deception of the Public*, 5 FED. CIR. B.J. 317, 328-36, 341 (1995) (providing a thorough textual analysis of the three preceding cases, and noting that the logical conclusion of *Hanson* would be to make the patent owner worse off, in some cases, for having “won” on his product claims). Moreover, as Voelzke notes, in many instances the rationale that a process cannot be marked is weak: a competent patent attorney can often draft both product and process claims for the same invention, and in many cases a patented process necessarily results in the production of a tangible item that could be marked with the process patent number. *See* Voelzke, *supra*, at 325-28, 338-39; *see also infra* note 107 (discussing ambiguities in the case law, and the strategies these ambiguities may engender).

17. *See* *Wine Ry. Appliance Co. v. Enter. Ry. Equip. Co.*, 297 U.S. 387, 398 (1936).

18. *See* Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L.J. 1, 29-37 (2001). If, however, the patent owner markets a nonpatented product in competition with the infringing product, and can prove that the infringing product has caused him to lose profits on the sale of the nonpatented product, he may be able to recover those lost profits. *See* *King Instruments Corp. v. Perego*, 65 F.3d 941, 947-53 (Fed. Cir. 1995); *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1544-49 (Fed. Cir. 1995) (en banc); *see also* Blair & Cotter, *supra*, at 32-33 n.150, 35 n.170 (discussing the interplay of these two cases and § 287(a)); 7 CHISUM, *supra* note 6, § 20.03[7][c][ii] (similar).

these examples, patent infringement is a strict liability tort in all relevant respects. Second, many patent owners who sell products that embody their patents make use of the marking provision, meaning that in many cases defendants are on at least constructive notice from the date they begin to infringe. Since constructive notice does not necessarily imply actual knowledge, an “innocent” defendant may still be liable for damages, as under a true strict liability regime. But for a variety of reasons,¹⁹ not every

19. Commentators have noted a number of reasons *why* patent owners may fail to comply with the statute. First, in cases in which the patent owner licenses someone else to manufacture the patented article, the patent owner may encounter problems in monitoring the licensee’s compliance with section 287. *See* 35 U.S.C. § 287(a) (1994) (imposing the marking requirement upon patentees “and persons making, offering for sale, or selling within the United States . . . for or under them”); *Maxwell v. J. Baker, Inc.*, 86 F.3d 1098, 1111-12 (Fed. Cir. 1996) (holding that a patentee that makes “reasonable efforts” to ensure the licensee’s compliance may recover damages); *Amsted Indus.*, 24 F.3d at 185 (holding that compliance is not excused when the patent owner manufactures and sells only a component of the patented invention, which its customers then combine with other elements to make the invention; and suggesting that the patentee should mark the component with the words “for use under U.S. Pat. No. X,XXX,XXX”); Preston Moore & Jackie Nakamura, *The United States Patent Marking and Notice Statute*, 22 AIPLA Q.J. 85, 91-93 (1994) (discussing what constitutes “reasonable efforts”). Second, in cases in which the patent owner begins marketing its product before the patent issues, it may be expensive to add the required notice to existing products after issuance. *See* Michael J. McKeon, *The Patent Marking and Notice Statute: A Question of “Fact” or “Act”?*, 9 HARV. J.L. & TECH. 429, 462 (1996). Although firms sometimes mark their products with the words “patent pending” prior to the issuance of an actual patent, the use of these words does not constitute sufficient notice for purposes of section 287. *See* 35 U.S.C. § 287 (1994) (requiring the patentee to mark the product with the patent number, which is impossible unless and until a patent issues); *State Indus. v. A. O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985); Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 265 n.73 (1994). *But see* *Steinthal v. Arlington Sample Book Co.*, 94 F.2d 748 (3d Cir. 1938) (affirming denial of damages recovery, where licensee failed to mark “patent pending” prior to issuance of patent, but did comply with marking provision thereafter). Falsely marking an unpatented product as if it were patented is, not surprisingly, unlawful, if accompanied by an intent to deceive. *See* 35 U.S.C. § 292 (1994); Moore & Nakamura, *supra*, at 90 (citing cases). Third, even after the patent issues, it may be difficult or expensive to comply with section 287—for example, by correctly marking a product that embodies many discrete patents, especially if the product design changes over time. *See* McKeon, *supra*, at 462-63; Moore & Nakamura, *supra*, at 97-98. Fourth, it is not clear what constitutes sufficient marking under every conceivable fact pattern, thus leaving open the possibility that patent owners’ good faith attempts to comply with section 287 will sometimes fail. *See* Carl Oppedahl, *Patent Marking of Systems*, 11 SANTA CLARA COMPUTER & HIGH TECH. L.J. 205, 222-26 (1995) (posing hypotheticals concerning what would constitute sufficient marking for a patented system that embodies multiple, possibly geographically dispersed, machines); *see also infra* note 73 (discussing sufficiency of marking). Finally, there may be strategic reasons not to mark in some cases. *See* ROBERT P. MERGES, PATENT LAW AND POLICY: CASES AND

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manufacturing or selling owner does mark.²⁰ In cases in which they do not mark, damages accrue only from the date of actual notice. Thus, there are some instances when using the term “strict liability” in connection with patent law can be misleading and perhaps should be abandoned.²¹ The standard of liability in patent law simply is what it is and does not need a label.

The question that naturally arises is whether “what it is” can be improved upon. In theory, there are at least four possible liability standards that could apply to patent infringement. First, one could devise a system in which independent discovery is a valid defense to a charge of patent infringement; this type of system would transform patent infringement largely (though not entirely) into an intentional tort.²² A second possibility would be to employ a negligence standard, meaning that a person would be liable for infringement only if she knows or should have known of the patent’s existence and that her conduct infringes. Third, one could employ

MATERIALS 1097 (2d ed. 1997) (stating that lawyers sometimes advise their clients not to mark, either “to plan a ‘sneak attack’ on competitors” against whom an injunction will be sought after the latter have invested in plants and equipment, or to avoid calling attention to a patent that will be easy to invent around); Voelzke, *supra* note 16, at 320-21.

20. A Westlaw search of the terms (287 w/3 (patent marking 35)) discloses eighteen reported or otherwise accessible Federal Circuit opinions over the past ten years (since January 1, 1992) in which the sufficiency of marking was an issue on appeal. *See, e.g.*, *Gart v. Logitech, Inc.*, 254 F.3d 1334, 1345-46 (Fed. Cir. 2001) (reversing judgment that letters from patent owner to defendant complaining about the latter’s TRACKMAN products did not constitute actual notice in conformity with section 287, but affirming judgment as to defendant’s MOUSEMAN products; at all relevant times, patent owner’s authorized licensee failed to mark patented products); *Lans*, 252 F.3d at 1327-28 (holding that notice provided by patent owner’s assignor was insufficient to comply with section 287, and that defendants were not liable for any damages given that (1) patent owner’s licensee marketed unmarked products, and (2) patent owner did not provide actual notice until after patent had expired); *see also* Oppedahl, *supra* note 19, at 205 n.2 (noting the author’s awareness of several unreported cases in which the amount of damages varied significantly depending on whether section 287 was satisfied, as well as his participation in settlements in which the amount “was more strongly influenced by marking (or the lack thereof) than by any other single factor”).

21. *Cf.* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 cmt. a (1998) (noting that use of the term “strict liability” in connection with liability for design defects and failures to warn, as opposed to manufacturing defects, is a common misnomer).

22. Presumably, the defendant might still be liable for unconscious copying, as in copyright law; thus, even with an independent discovery defense, patent infringement does not become a purely intentional tort. We suppose that one could advocate a standard of liability that requires the plaintiff to show intentional copying, although the costs of implementing such a system are likely to be prohibitive. *See infra* notes 48-52 and accompanying text (arguing that, even without requiring proof of intent, requiring proof of copying would have undesirable consequences).

a (true) strict liability standard, under which the plaintiff may recover damages for conduct occurring even before the defendant has (or could be expected to have) knowledge or notice that the conduct infringes. Fourth, one could employ a standard similar to the one we actually have, in which damages liability is conditioned upon notice or knowledge. This possibility in turn could take different sub-forms, including: a rule under which the defendant is not liable for damages accruing before the receipt of actual notice; a rule exempting her from damages in the absence of constructive notice, whether of the type contemplated by the marking statute or otherwise; a rule permitting the recovery of damages against defendants who have actual *knowledge*, regardless of the presence of actual or constructive *notice*; or some combination of these principles.

We shall demonstrate that each of these liability standards has its peculiar advantages and disadvantages. In Part II, we present several reasons, grounded more in practice than in theory, for rejecting the Maurer-Scotchmer thesis that patent law should adopt an independent discovery defense. In Part III, we show that a strict liability standard is generally preferable to a negligence standard in the patent infringement context. In Part IV, we argue that a system requiring damages to be conditioned upon the infringer's possession of notice or knowledge that her conduct infringes is an improvement over a system of pure strict liability. We also argue that the marking statute, in its present form, is incoherent, and we suggest some reforms. Finally in Part V, we present some closing remarks.

II. INDEPENDENT DISCOVERY

In a provocative recent paper, Stephen Maurer and Suzanne Scotchmer argued that the recognition of an independent discovery defense in patent law would, in at least some cases, provide the patentee with a sufficient reward while simultaneously reducing the potential deadweight loss from the assertion of patent rights.²³ In the following paragraphs, we shall

23. Stephen M. Maurer & Suzanne Scotchmer, *The Independent-Invention Defense in Intellectual Property* (John M. Olin Working Paper Series, No. 98-11, Boalt Hall School of Law, Berkeley, Cal., 1998), available at <http://socrates.berkeley.edu/~scotch/>. This paper will be published in a forthcoming issue of *Economica*. For a paper that foreshadows some aspects of the Maurer-Scotchmer analysis, see Douglas Gary Lichtman, *The Economics of Innovation: Protecting Unpatentable Goods*, 81 MINN. L. REV. 693 (1997). Lichtman argues that state laws forbidding the copying of unpatentable inventions do not conflict with federal patent law, as long as the cost of inventing a noninfringing substitute is sufficiently low in comparison with the R&D cost of the original invention. See *id.* at 720-23 (presenting model). In this context, the inventor of the nonpatentable invention would be expected to license the invention to competitors and to earn a

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sketch out the intuition behind the Maurer-Scotchmer thesis; readers who are interested in a more detailed analysis are directed to the working paper itself, cited below. We then address what we view as the (mostly practical) shortcomings of the thesis.

At first blush, the thesis that an independent discovery defense could improve social welfare may seem counterintuitive. After all, the most common justification for the existence of the patent system is that the provision of exclusive rights in inventions is necessary to induce inventors to invent and to disclose the fruits of their inventive efforts.²⁴ In the absence of a patent system, so the argument goes, free riders would undermine the incentive to invent and disclose by appropriating the benefits of invention without sharing in the concomitant research and development costs.²⁵ Patent rights, therefore, induce invention and disclosure by facilitating inventors' ability to internalize the benefits of these activities for a period of time.²⁶ By threatening to reduce these benefits, an independent discovery defense seems antithetical to the premise on which the system is based.

On closer inspection, however, the case against independent discovery is not quite so airtight, even if one accepts the conventional wisdom that patents are necessary to induce the socially optimal level of invention and disclosure. For one thing, independent discovery is legal in both trade secret and copyright law; thus, any argument that independent discovery *necessarily* reduces the incentive to create socially useful things to an unacceptable level must account for why the practice is permitted in other bodies of intellectual property law. There are some obvious differences between the subject matter of copyrights and trade secrets, and the subject matter of patents that may explain the discrepancy. With respect to copyright, for example, although it is legal for someone to independently create a work of authorship that is substantially similar to an existing work, in practice this may be rare and therefore unlikely to affect the copyright owner's incentives.²⁷ In addition, First Amendment considerations may

reward that does not exceed his R&D costs. *See id.* Implicitly, if the cost of R&D and the cost of independent discovery are about equal and the invention is patentable, a patent law that forbids copying but permits independent discovery would result in the patentee earning a reward in excess of his R&D costs, a result consistent with the Maurer-Scotchmer analysis. *See infra* text accompanying notes 36-43.

24. *See* Blair & Cotter, *supra* note 18, at 45.

25. *See id.*

26. *See id.*

27. *See id.* at 69 n.299 (making this point); David Nimmer & Eaton S. Drone, *Copyright in the Dead Sea Scrolls: Authorship and Originality*, 38 HOUS. L. REV. 1, 38-39 (2001) (similar); *see also* William P. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325, 345-46 (1989) (arguing that the relative un-

play a role in the law's decision not to empower the copyright owner to enjoin the independent creation of substantially similar works.²⁸ In patent law, on the other hand, the probability of independent development of an invention containing all the elements of a patented invention may be relatively high, as demonstrated by the fact that, at any given time, multiple researchers *are* working on the very same engineering and scientific problems.²⁹ Therefore, having to determine whether such cases involve copying or independent discovery might impose more administrative costs and have a more serious effect upon incentives to invent than in a copyright system.³⁰ With respect to trade secrets, the limited nature of the right as

unlikely of the independent creation of substantially similar works of authorship, as well as the relative difficulty of conducting a search of existing works of authorship, explains why patent and copyright law treat independent discovery differently). This observation is reinforced by the fact that copyright does not subsist in things such as facts, ideas, short phrases, and *scènes à faire*, and by the merger doctrine. See Thomas F. Cotter, *Intellectual Property and the Essential Facilities Doctrine*, 44 ANTITRUST BULL. 211, 220-21 (1999) (discussing these doctrines).

28. Cf. Blair & Cotter, *supra* note 18, at 60 n.268 (suggesting that First Amendment considerations may explain why copyright liability does not extend to certain uses of copyrighted works); Thomas F. Cotter, *Gutenberg's Legacy: Copyright, Censorship, and Religious Pluralism* (March 14, 2002), at 7-8 n.26-28 (unpublished manuscript, on file with authors) (noting that various copyright doctrines are traditionally viewed as preventing a conflict between copyright and the First Amendment).

29. A famous example of independent discovery of a pioneering invention is the near-simultaneous invention of the telephone by Alexander Graham Bell and by Elisha Gray. See EDWIN S. GROSVENOR & MORGAN WESSON, *ALEXANDER GRAHAM BELL: THE LIFE AND TIMES OF THE MAN WHO INVENTED THE TELEPHONE* 45-49 (1996). Outside the realm of patent law, the two most famous examples of the independent discovery of major scientific principles are the discovery by Newton and Leibniz of calculus, and by Charles Darwin and Alfred Russell Wallace of the principle of natural selection. See ROBERT S. WESTFALL, *NEVER AT REST: A BIOGRAPHY OF ISAAC NEWTON* 514-20 (1980) (discussing the Newton-Leibniz controversy); ROBERT WRIGHT, *THE MORAL ANIMAL: EVOLUTIONARY PSYCHOLOGY AND EVERYDAY LIFE* 301-10 (1994) (discussing the Darwin-Wallace episode); see also William F. Ogburn & Dorothy Thomas, *Are Inventions Inevitable? A Note on Social Evolution*, 37 POL. SCI. Q. 83, 93-98 (1922) (listing prominent inventions and discoveries independently made) (cited in *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 490 (1974)). But see Richard H. Stern, *A Reexamination of Preemption of State Trade Law After Kewanee*, 42 GEO. WASH. L. REV. 927, 950 (1974) (pointing out that, as of 1974, no one had yet succeeded in proving Fermat's Last Theorem). Cf. SIMON SINGH, *FERMAT'S ENIGMA: THE QUEST TO SOLVE THE WORLD'S GREATEST MATHEMATICAL THEOREM* 283-84 (1997) (discussing Steven Wiles's 1994 proof of the theorem, which relies upon twentieth-century developments in mathematics, and noting the opinion of some skeptics that Fermat's proof, whatever it was, was flawed). See also *infra* notes 63-64 and accompanying text (discussing patent races).

30. See Blair & Cotter, *supra* note 18, at 60 n.268; see also *infra* notes 48-51 and accompanying text (discussing administrative cost of distinguishing copying from inde-

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traditionally understood³¹ might itself explain why more defenses should be available to an alleged misappropriation. We return to this point below.³² Finally, it may be relevant that the cost of searching, prior to creation, for substantially similar copyrighted works or for identical trade secrets would be enormous. Given the relatively low level of originality necessary for copyright protection, copyrighted works are ubiquitous,³³ and U.S. law does not require copyright registration except as a precondition to litigation.³⁴ And for obvious reasons there is no way to search for another person's trade secrets. Patent searches are at least possible because all patents are public records, although this does not suggest that the cost of conducting a patent search prior to engaging in the manufacture or sale of a new product is minimal.³⁵ Indeed, the preceding discussion only highlights some *possible* reasons for adopting a different rule for patents than for copyrights and trade secrets; it does not prove that patent law must eschew independent discovery to induce the optimal amount of invention.

The Maurer-Scotchmer paper provides a valuable contribution by describing the circumstances under which an independent discovery defense may, or may not, have a material effect upon the incentive to invent. The

pendent discovery). Patent scope also tends to be broader than copyright scope, in the following sense. As noted above, a patent reads on any device that contains all of the functional elements of the patented device; and under the doctrine of equivalents, the patent may also read on devices that perform substantially the same function in substantially the same way to produce the substantially same result, even though the elements are not identical. *See Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 35, 38, 40 (1997) (citations omitted). Copyright protects only the author's original expression, selection, or arrangement, and not functional or utilitarian aspects of a work, *see* 17 U.S.C. § 102 (1990), although copyright protection for computer software tends to blur this distinction somewhat. To the extent that patent rights are typically "stronger" or broader than copyright rights, perhaps it is not surprising that patent law affords fewer defenses than copyright; but on closer analysis appeals to the relative strength of patent rights beg the question of whether patent rights *need* to be as strong they are, particularly with respect to independent discovery.

31. That is to say, trade secret law is more an outgrowth of contract and tort law than of property law. A trade secret owner's rights are not valid against the world, but rather only against persons who have acquired the secret in certain ways or who stand in a confidential relationship to the owner. *See UNIF. TRADE SECRETS ACT* §§ 2-3, 14 U.L.A. 437 (1990 & Supp. 2001). Moreover, trade secret protection is, by design, less powerful than patent protection, a point to which we shall return shortly. *See infra* notes 53-58 and accompanying text.

32. *See infra* notes 54-58 and accompanying text.

33. *See* Roger D. Blair & Thomas F. Cotter, *An Economic Analysis of Seller and User Liability in Intellectual Property Law*, 68 U. CIN. L. REV. 1, 31-32 (1999).

34. *See* 17 U.S.C. § 411(a) (1994).

35. In some industries, it would be quite high, *see infra* text accompanying notes 69-70, and anecdotal evidence suggests that such searching is not frequently done.

authors begin with a model in which the costs of research and development, as well as the cost of independent invention, are relatively low.³⁶ On the basis of this assumption, the authors demonstrate that a patentee can deter entry on the part of an independent inventor (who would otherwise enter and compete as a Cournot duopolist³⁷) by licensing his patent to n licensees for a royalty that is less than the cost each licensee would face if she were to independently invent.³⁸ Using this strategy, the patentee can ensure that the licensees will be better off as licensees than they would have been as independent inventors/competitors.³⁹ At the same time, the patentee is better off than he would be if the licensees were to independently invent and compete against him.⁴⁰ Of course, the patentee earns a lower profit than he would have earned under a regime without an independent invention defense, but his licensing revenue will exceed his own research and development costs.⁴¹ His reward therefore is sufficient to induce him to undertake R&D but will result in a lower deadweight loss.⁴² Maurer and Scotchmer also show that, under these assumptions, the threat of ex post competition will deter some firms from entering the race to invent the patented item, thus potentially reducing wastefully duplicative research and development costs.⁴³

The limitations imposed by the model's assumptions suggest extreme caution in deriving any practical policy recommendations from it. First, as Maurer and Scotchmer recognize, their proposal does not improve social welfare if the patentee's cost of research and development is high relative to the cost of independent discovery—for example, when the ex ante probability of inventive success is low.⁴⁴ To make up for this potential de-

36. See Maurer & Scotchmer, *supra* note 23, at 4-5.

37. In a Cournot duopoly, firms compete by setting quantities. See DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 153-93 (3d ed. 2000)

38. Maurer & Scotchmer, *supra* note 23, at 4-5.

39. See *id.* at 4-5.

40. See *id.*

41. See *id.* at 4-6.

42. See *id.*

43. See *id.* at 7-9.

44. See *id.* at 14. Maurer and Scotchmer explain:

There are two basic reasons that the costs of duplication can be lower. First, merely knowing that someone has invented a product can be important for expected costs of duplication in cases where significant *ex ante* doubts exist about whether the proposed product can be made at all. (The atomic bomb is a particularly notorious example.) Second, competitors can cheat by claiming that they independently invented what they surreptitiously copied. . . .

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fect, Maurer and Scotchmer suggest that Congress could enact a series of exemptions from the independent-discovery defense for certain classes of inventions.⁴⁵ One problem with this approach, however, is that it would be sure to encourage rent-seeking on the part of industries claiming an entitlement to the exemption. Moreover, those industries in which R&D costs are sufficiently high that they ought to be exempt from the independent discovery defense⁴⁶ may well be the same ones in which the deadweight loss attributable to patent protection is highest, because there are fewer nonpatented alternatives to their patented products. In industries where R&D costs are lower, the probability that a patent will confer monopoly rights in an economically meaningful sense is probably much lower, or, to put it another way, designing around the patent to create a competing but noninfringing product is probably more feasible.⁴⁷ This means that the

Pharmaceuticals are probably the best example of an industry with significant *ex ante* uncertainty about success. The probability of achieving a marketable, FDA-approved drug is about 1/5, conditional on having sunk the development costs. If the cost of every pharmaceutical that comes to market is \$.2b, firms must anticipate \$1b in revenues in order to cover costs on average. The effective cost of each new drug is therefore \$1b, since this is the minimum compensation needed to induce firms to invest. On the other hand, an independent invention defense could let imitators avoid “dry holes” and cut their R&D costs by 80%. In such a case, the threat of duplication would undermine the patent-holder’s profit to the point where he could no longer cover his costs.

Id.

45. *See id.* at 15. Alternatively, Maurer and Scotchmer suggest that, “in cases with significant *ex ante* uncertainty of success (e.g., pharmaceuticals) judges would rule that independence is impossible”; or that “courts should set patent breadth so that the costs of imitation approximate the original inventor’s effective cost averaged over an appropriate number of dry holes.” *Id.* Judges may be less susceptible to regulatory capture than legislators or administrative agencies, but we still find ourselves somewhat skeptical over the courts’ institutional capacity to pick the right industries, or to set patent breadth, with such precision.

46. Maurer and Scotchmer suggest that the pharmaceutical industry is one of these industries. *Id.*

47. *See, e.g.,* Thomas F. Cotter, *Is This Conflict Really Necessary? Resolving an Ostensible Conflict Between Patent Law and Federal Trademark Law*, 3 MARQ. INTELL. PROP. L. REV. 25, 32-33 (1999) (noting that most patents do not confer monopoly power). Moreover, even when patents confer a degree of market power, long-run strategic considerations may constrain the patent owner from charging the price that would maximize profits in the short run. *See* Ian Ayres, *Pushing the Envelope: Antitrust Implications of the Envelope Theorem*, 17 MISS. C. L. REV. 21, 24 (1996) (suggesting that the possibility of incurring antitrust liability may in some cases constrain patent owners from charging the monopoly price for their products); F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 730-32 (2001) (suggesting that patentees have an incentive not to charge the monopoly price, in order to

deadweight loss attributable to patent protection may be relatively low even in the absence of an independent discovery defense. If this is so, however, then under the Maurer-Scotchmer proposal the independent discovery defense would apply only in cases in which there is the least need for it. Such limited benefits must then be offset against the social cost of effecting change, which would include not only the rent-seeking noted above but also administrative costs and other problems discussed below.

A second problem with an independent discovery defense is that the patentee's competitors may have an incentive to copy but claim independent discovery, and that the attendant cost of determining whether a competing product is the result of copying or independent discovery could be substantial.⁴⁸ In response, Maurer and Scotchmer suggest that competitors could borrow the practice of software companies, which typically use "clean room" procedures to isolate their code-writing engineers from contact with the code embedded in products with which the companies wish to compete.⁴⁹ Presumably, firms that do not adopt clean room procedures

maintain market share); Edmund Kitch, *Patents: Monopolies or Property Rights?*, 8 RES. L. & ECON. 31, 38-39 (1986) (similar).

48. See Maurer & Scotchmer, *supra* note 23, at 15-16. As several readers of an earlier draft of this paper have pointed out, however, state of mind is an issue in many patent cases—for example, in the common instance in which the patent owner alleges willful infringement. See *infra* notes 102-103 and accompanying text (discussing willful infringement). To the extent that state of mind is already a frequently litigated issue, the additional litigation cost imposed by an independent discovery defense may not be as great as suggested above. The question remains whether the social benefits of permitting state of mind to be litigated to the extent permitted under current law justify the resulting cost; maybe patent law already departs farther than is optimal from the strict liability model. A related question is whether a patent regime that made the infringer's state of mind irrelevant in all respects—thus doing away not only with notice as a precondition to the recovery of damages, but also with enhanced damages for willful infringement—would result in less infringement, by making the recovery of some damages more certain, or more infringement, by reducing the penalty for willful violations. Finally, it may be worth considering whether the prospect of enhanced damages for willful infringement serves as a counterweight to the unavailability of pre-notice damages, as well as other circumstances in which state of mind is relevant under existing law and how these problems interact with the liability standard. We would like to address these questions in future work but do not attempt to do so here.

49. See *id.* at 13; see also Douglas K. Derwin, *Licensing Software Created Under 'Clean Room' Conditions*, 276 PLI/Pat 439, 450-54 (July 1, 1989) (discussing clean room techniques). Conceivably, the actual use of clean room would not be necessary if the Maurer-Scotchmer plan worked as intended. A would-be user could merely threaten to use a clean room to independently invent, in the event that the patentee refused to license her, thus inducing the licensing transaction that promises to make both parties better off. In addition, presumably a competitor would be able to take advantage of the clean room

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would have a difficult time proving independent discovery.⁵⁰ Once again, however, we question whether the proposed modification would be practical as applied to patentable inventions. In the software industry, an engineer may be relatively unlikely to come into contact accidentally with a competitor's code. As other commentators have pointed out, however, limiting exposure to a wide variety of patented inventions is not so easy.⁵¹ Creating an incentive to avoid contact with existing patents might also have perverse consequences, inasmuch as the information contained in existing patents might inspire researchers to discover new and better ways of achieving the same result, or new avenues of research altogether.⁵² Absent a practical means of avoiding such contact, however, cheating may be rampant, and the resulting administrative costs of detecting it must be weighed against any potential benefits of independent discovery.

Third, even if an independent discovery defense leaves intact the incentive to invent, it might undermine the inventor's incentive to disclose the fruits of his invention, encouraging him to rely upon trade secret protection.⁵³ Thus, even if a regime that recognizes an independent-discovery

procedure only if it did not give the clean room-sequestered employees "hints" as to how the problem is to be solved. We thank Stephen Maurer for clarifying these points.

50. The above discussion assumes that independent discovery is a defense, that is, that the plaintiff must prove an unauthorized manufacture, use, or sale of the patented invention, and that the defendant then may assert independent discovery as a defense. This framework would parallel the rule applied in copyright law. Although the plaintiff in a copyright action must prove copying, evidence that the defendant's work is similar to the plaintiff's and that the defendant had access to the latter is sufficient to shift the burden of proving independent discovery to the defendant. *See* *Three Boys Music Corp. v. Bolton*, 212 F.3d 477, 486 (9th Cir. 2000); *Herzog v. Castle Rock Entm't*, 193 F.3d 1241, 1249 (11th Cir. 1999).

51. *See* Martin J. Adelman, *Property Rights Theory and Patent-Antitrust: The Role of Compulsory Licensing*, 52 NYU L. REV. 977, 984 (1977).

52. *But see infra* note 53 (noting some commentators' skepticism over the disclosure rationale of patents).

53. *See, e.g.*, Blair & Cotter, *supra* note 18, at 78-80 (noting that the four most common justifications for the patent system are that it encourages invention, disclosure, and commercialization, and that it may facilitate the efficient coordination of follow-up inventions). The disclosure rationale can be criticized on various grounds. One is that the Patent Act requires the patentee to provide an enabling disclosure and to set forth his "best mode" as of the date he files the application, *see* 35 U.S.C. § 112; 3 CHISUM, *supra* note 6, § 7.05[1][a]; Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 287 (1977) [hereinafter Kitch, *Nature and Function*], but not to disclose any subsequent improvements he may discover in the manner of making or using the invention, *see* Kitch, *Nature and Function, supra*, at 287. This latter information may qualify as a trade secret, however; and Professor Kitch argues that the patent framework facilitates the transfer of this latter information, by reducing the problems associated with Arrow's information paradox. *See* Kitch, *Nature and Function, supra*, at 287-88; Ed-

defense offers a reward that is sufficient to cover the patentee's R&D costs, the inventor might opt for trade secrecy if the latter offers the prospect of a higher reward. Of course, independent discovery of a trade secret is lawful as well, but the inventor does not have to disclose his information to the world in exchange for trade secret protection.⁵⁴ In some cases, then,

mund W. Kitch, *The Patent Policy of Developing Countries*, 13 UCLA PAC. BASIN L.J. 166, 171-76 (1994); see also Rebecca S. Eisenberg, *Patents and the Progress of Science*, 56 U. CHI. L. REV. 1017, 1029-30 (1989) (arguing that the patent system promotes disclosure by making it easier for inventors to sell or license their inventions to others). Second, one might argue that, if the inventor believes he can keep his invention secret, he is better off relying upon trade secret than patent protection, because trade secret protection is of potentially infinite duration. See posting of Professor Dan Burk, University of Minnesota Law School, to ipprofs listserv (Feb. 13, 2001) (on file with authors) (making this argument). On this reasoning, the inventor who expects that his discovery will be independently discovered or reverse-engineered within, say, two years has an incentive to apply for a patent, which if granted will extend his exclusive rights for up to twenty years, rather than to rely upon trade secret protection, which is likely to terminate upon the date of independent discovery. In such a case, however, the patent system does not induce any additional disclosure than would otherwise occur, because by hypothesis the invention is expected to be independently discovered or reverse-engineered within two years. This argument nevertheless ignores several relevant factors. First, independent discovery or reverse engineering is not necessarily the same thing as public disclosure. Information can remain a trade secret, even though it is known to two or more competitors within a given industry, as long as it is not readily ascertainable by proper means by others. See RESTATEMENT (THIRD) OF UNFAIR COMPETITION § 39 cmt. f (1995). Second, if in the preceding example the expected date of independent discovery or reverse engineering is earlier than what the actual date of independent discovery or reverse engineering would have been, the patent system has succeeded in inducing early disclosure (although this benefit must be weighed against the greater social costs of patent protection). More generally, suppose that the expected date of independent discovery or reverse engineering is uncertain, but that the inventor expects this event to occur within five years. Whether he is better off choosing patent or trade secret protection may depend on other facts (for example, the obsolescence rate of the technology, the inventor's taste for risk, the probability of successfully obtaining a valid patent, and so on). In some cases, it may be rational for the inventor to apply for a patent, despite the fact that patent protection risks disclosing his invention "early," to the relative uncertainties of trade secret protection.

54. If the invention is a product that the inventor sells to the public, it is likely that someone will discover the trade secret through reverse engineering sooner or later. See Adelman, *supra* note 51, at 981-82. Reverse engineering or independent discovery may not be inevitable, however; witness Coca-Cola's long-held trade secret on the formula for its soft drink. See also Stern, *supra* note 29, at 950. Moreover, if the invention is a process, reverse engineering of the resultant product does not necessarily reveal the nature of that process. See Joan E. Schaffner, *Patent Preemption Unlocked*, 1995 WIS. L. REV. 1081, 1122 (citing Martin J. Adelman, *Trade Secrets and Federal Pre-emption—The Aftermath of Sears and Compco*, 49 J. PAT. OFF. SOC'Y 713, 725-27 (1967)); Leon Radomsky, *Sixteen Years After the Passage of the U.S. Semiconductor Chip Protection Act*:

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the existence of an independent discovery defense in patent law might encourage secrecy, and it is unclear whether the expected reduction in the deadweight loss outweighs the social cost of secrecy. Alternatively, an independent discovery defense in patent law might undermine the rationale of the Supreme Court's decision in *Kewanee Oil Co. v. Bicron Corp.*⁵⁵ that federal patent law does not preempt state trade secret law.⁵⁶ One of the factors the Court cited in support of its conclusion that trade secret law is sufficiently weak in comparison with patent law to avoid preemption with the latter, is that trade secret law permits independent discovery.⁵⁷ The recognition of independent discovery as a defense to patent infringement therefore might lead to the preemption of trade secret law. It is far from certain, however, that this would be a good result, since many analysts be-

Is International Protection Working?, 15 BERKELEY TECH. L.J. 1049, 1078 (2000) (citing Robert L. Risberg, Jr., Comment, *Five Years Without Infringement Litigation Under the Semiconductor Chip Protection Act: Unmasking the Spectre of Chip Piracy in an Era of Diverse and Incompatible Process Technologies*, 1990 WIS. L. REV. 241, 256 (1990)).

55. 416 U.S. 470 (1974).

56. *Id.* at 492-93.

57. *See id.* at 489-90. To be more precise, the Court separately considered four cases in which patent and trade secret law might conflict; first, when the subject of the trade secret comprises nonpatentable subject matter; second, when it comprises patentable subject matter that the inventor "knows will not meet the standards of patentability"; third, when it comprises patentable subject matter but the inventor "has a legitimate doubt" as to the invention's patentability; and fourth, when it comprises a "clearly patentable invention." *See id.* at 482-92. The arguments in favor of permitting trade secret protection for the first three categories are relatively straightforward. *See id.* at 482-89 (concluding that, in the first two cases, trade secret law does not frustrate the federal policy in favor of disclosure of inventions and may encourage some innovation; and that, in the third case, trade secret law reduces the social cost of prosecuting and defending patents of dubious validity). When the inventor chooses trade secret over patent protection for a clearly patentable invention, however, his choice does tend to undermine the federal goal of disclosure. *See id.* at 489. The majority in *Kewanee* nevertheless concluded that this conflict between federal and state law is minimal, because patent protection is so much stronger than trade secret protection that few inventors prefer trade secret to patent protection when both forms are available for the same invention. *See id.* at 490. As others have pointed out, however, this conclusion is not necessarily true; sometimes inventors may prefer trade secret protection, despite its potential infirmities, because it permits them to keep their inventions secret. *See supra* note 53 (discussing disclosure); *see also* Stern, *supra* note 29, at 946-52. As the Court also noted in *Kewanee*, however, a rule preempting trade secret law only with respect to patentable inventions would be difficult to administer. *See Kewanee Oil*, 416 U.S. at 492. *But see* Stern, *supra* note 29, at 986-88 (expressing doubt that a partial-preemption regime would be infeasible). But if preemption must be an all-or-nothing proposition in the present context, and if the availability of trade secret protection offers some social benefits that total preemption would destroy, then there must remain some distinctions between patent and trade secret law; and the lack of an independent discovery defense in patent law is one obvious candidate.

lieve that trade secret law provides a useful complement to patent protection.⁵⁸

A fourth problem is that the Maurer-Scotchmer thesis depends upon the patentee being able to license the invention, but licensing is not always a feasible choice in the real world. The transaction costs of and other obstacles to licensing can be burdensome for a number of reasons, including asymmetric information; the potential for competition from substitutes for the patented invention; the interdependence of potential licensees' demand curves; and the fact that licensees are free to challenge the patent's validity.⁵⁹ As a result, licensors typically receive only a portion of the total profit that is theoretically available from the exploitation of their inventions, with one study showing an average of just forty percent.⁶⁰ Of course, licensing can be a rational strategy when the licensee can produce or market the patented good at lower cost than can the patentee, or have other advantages. Nevertheless, to the extent that Maurer and Scotchmer assume away the transaction costs of licensing,⁶¹ their proposal may overestimate the social benefits to be gained from an independent discovery defense.

The following hypothetical illustrates the fifth problem. Suppose that, in a system that recognizes the independent discovery defense, A patents an invention, B independently discovers the same invention, and C then markets yet another embodiment of the same invention. If B's invention is not patentable and C is therefore free to copy from B,⁶² the value of A's

58. See David D. Friedman et al., *Some Economics of Trade Secret Law*, 5 J. ECON. PERSP. 61, 64 (1991); Kitch, *Nature and Function*, *supra* note 53, at 288; cf. Dan Burk, *Muddy Rules for Cyberspace*, 21 CARDOZO L. REV. 121, 172 (1999) (suggesting that trade secret law economizes on self-help expenses that businesses would otherwise incur to keep information secret); Stern, *supra* note 29, at 970 (questioning this rationale for trade secret law). *But see* Robert G. Bone, *A New Look at Trade Secret Law: Doctrine in Search of Justification*, 86 CALIF. L. REV. 241, 260-83 (1998).

59. See Roger D. Blair & Thomas F. Cotter, *The Elusive Logic of Standing Doctrine in Intellectual Property Law*, 74 TUL. L. REV. 1323, 1404-05 (2000); Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 1052-66 (1997) (arguing that transaction costs may inhibit some otherwise beneficial licensing transactions from going forward).

60. See Blair & Cotter, *supra* note 59, at 1405 (citing Richard E. Caves et al., *The Imperfect Market for Technology Licenses*, 45 OXFORD BULL. ECON. & STAT. 249, 258 (1983)).

61. See Maurer & Scotchmer, *supra* note 23, at 3-4.

62. B's independently discovered invention would *not* be patentable, absent further modifications of the law. See 35 U.S.C. § 102 (1994) (stating that a person is not entitled to a patent if, *inter alia*, before his date of invention another had already obtained a patent

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patent plummets further. Of course, B will not independently invent, and C therefore will not copy from B, if A follows the licensing strategy suggested by Maurer and Scotchmer. But if for some reason that strategy turns out to be impracticable, A risks having his patent become worthless. (C also would have an incentive to cheat, by claiming to have copied from B and not A, even if he actually copied from A). Alternatively, if B's independently discovered invention *were* patentable, this would create problems of its own. For one thing, this policy would prolong the eventual date on which the invention falls into the public domain, unless in cases such as this the law provided that all patent terms for the same invention must end on the same date. Furthermore, it would complicate matters for potential users or licensees of the invention. Would potential licensees have to license from both A and B? If so, would this deter the optimal use of the invention? Or would it cut into the incentive to invent, by lowering the expected rewards of both A and B?

Sixth, as Maurer and Scotchmer themselves recognize, there is considerable debate over whether patent races are, on balance, a bad thing.⁶³ Although patent races may give rise to wastefully duplicative research and development expenses, they also may accelerate the production of the invention—or give rise to new insights along the way.⁶⁴ To the extent that patent races may confer benefits upon society, an independent discovery rule designed to reduce incidences of these races may be counterproductive. Finally, recognition of an independent discovery defense in patent law, whatever its merits may be, would probably be unlawful under article

on the same invention or otherwise disclosed the invention in a printed publication, or the invention was known or used in the United States).

63. See Maurer & Scotchmer, *supra* note 23, at 17.

64. Professor Scotchmer herself has written on the division of opinion regarding the desirability of patent races. See Suzanne Scotchmer, *Incentives to Innovate*, in PALGRAVE ENCYC. OF LAW & ECON. 273, 275 (1998) (noting “two views on patent races: that they inefficiently duplicate costs, and that they efficiently encourage higher aggregate investment”); see also JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 400 (1988) (noting that the loser in a patent race may benefit from positive spillovers, may develop another product, and may gain experience for future races); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 870-79 (1990) (arguing that empirical evidence is more consistent with the theory that competition in the market for improvements spurs innovation, despite possible efficiency losses attributable to rivalrous invention); Jennifer F. Reinganum, *The Timing of Innovation: Research, Development, and Diffusion*, in 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 849, 853-68 (Richard Schmalensee & Robert D. Willig eds., 1989) (discussing literature on patent races).

28 of the TRIPs Agreement.⁶⁵ While this is not an argument against the proposal on the merits, it does highlight the practical difficulty of implementing it.

III. NEGLIGENCE VERSUS STRICT LIABILITY

A second alternative to an intent-based standard would be a negligence standard, under which an infringer would be liable only if she did not conduct an efficient amount of searching. This might be less harmful to the patentee than an independent discovery rule, since some independent discovery would remain illegal. As explained below, however, a negligence standard would also impose high administrative costs, because the stan-

65. Member nations are obligated to confer upon patent owners the exclusive right to prevent others from making, using, offering for sale, selling, or importing the patented invention. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, art. 28, LEGAL INSTRUMENTS—RESULTS OF THE URUGUAY ROUND vol. 31, 33 I.L.M. 1197 (1994) [hereinafter TRIPs]. Nations may provide limited exceptions to these rights, “provided that such exceptions do not unreasonably conflict with a normal exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent owner, taking account of the legitimate interests of third parties.” *Id.* art. 30. Although we have found no authority addressing the issue of whether an independent discovery defense would conflict with TRIPs, our research has uncovered no evidence that any other country currently recognizes this defense. This fact by itself might suggest that such an exception would “unreasonably conflict with the normal exploitation of the patent.” Exceptions that are commonly viewed as falling within the scope of article 30 include (1) prior use (i.e., a person who has made a secret use of an invention prior to another’s invention and patenting thereof may in some circumstances be permitted to continue using it after the issuance of the patent); (2) private noncommercial use; (3) some experimental, research, and teaching uses; (4) pharmaceutical preparation for individual doses of medicine according to prescription; (5) acts done in reliance that they were not prohibited by a valid patent claim as initially granted, but that come within the scope of the patent as subsequently amended; (6) governmental use; and (7) (probably) importation of a patented product that has been marketed in another country with the consent of the patent owner. See CARLOS M. CORREA & ABDULQAWI A. YUSUF, INTELLECTUAL PROPERTY AND INTERNATIONAL TRADE, THE TRIPs AGREEMENT 207-08 (1998); CARLOS M. CORREA, INTELLECTUAL PROPERTY RIGHTS, THE WTO AND DEVELOPING COUNTRIES 75-76, 240-41 (2000); MARKUS NOLFF, TRIPs, PCT AND GLOBAL PATENT PROCUREMENT 19-21 (2001); see also Maureen O’Rourke, *Toward a Doctrine of Fair Use in Patent Law*, 100 COLUM. L. REV. 1177, 1201 (2000) (arguing that TRIPs would permit a limited fair use defense to claims of patent infringement). Technically, the TRIPs Agreement only obligates member nations to impose TRIPs’s minimum standards with respect to the nationals of other member nations, and not with respect to members’ own nationals. See TRIPs, *supra*, art. 1(3). Nevertheless, it seems unlikely that many nations would find it politically popular to impose an independent discovery defense upon their own patent owners if they lacked the ability to do so with respect to foreign patent owners.

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dard of care would vary from one case to another. For this reason, we conclude that strict liability is superior to negligence in this context.

In this analysis, we shall consider the case of unintentional (i.e., inadvertent or accidental) patent infringement, as opposed to “knowing” infringement. In other words, a firm invests time, money, and talent in order to invent a new product or process; it independently discovers something that has already been patented by another firm; and in total ignorance of the prior discovery, it proceeds to market its new product and thereby infringes the valid patent issued to another firm. There are a variety of liability rules that could be implemented. These include strict liability and various negligence standards: simple negligence, contributory negligence, and comparative negligence. Liability rules have allocative significance regarding the expenditure of resources to avoid infringement. They also have distributive significance regarding the identity of the party who bears the risk of infringement. We examine these issues below.

A. Strict Liability

A rule of strict liability for patent infringement allows no accommodation can be made for unintentional infringement. Irrespective of the fact that the infringer took measures—even substantial measures—to avoid patent infringement, if she infringed a valid patent, the infringer will be liable for the full economic injuries that the infringement caused. In principle, the patentee will receive full compensation for any injury due to the infringement.⁶⁶

Presumably, unintentional infringement occurs because information regarding extant patents is imperfect. The infringer must have been unaware that her “new” product or process infringed a valid patent held by another party for the infringement to be inadvertent. Acquiring perfect information regarding the existence of valid patents would eliminate inadvertent infringement.⁶⁷ Combing the Patent Office records and carefully analyzing the existing patents can reduce the probability of inadvertently infringing a valid patent. But these search efforts are costly and, therefore,

66. This is problematic. *See infra* note 74 and accompanying text.

67. This may be too strong, since there can be an honest difference of opinion as to whether something infringes a valid patent. Indeed, until a court definitively construes the patent claims and decides whether the accused device infringes, the best that either patentee or alleged infringer can do is to assess the probability of infringement. *See* Carl Shapiro, Antitrust Limits to Patent Settlements, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=273552, at 9 (describing patents as “*partial* or *probabilistic* property right[s]”).

a complete search, i.e., perfect information, is not optimal. A simple economic model demonstrates this.⁶⁸

Suppose that the patent infringement causes an economic injury represented by D . The probability of infringing a valid patent is a function of the search efforts expended by the potential infringer, i.e., $P = P(S)$ where P denotes the probability of infringement and S denotes the units of search. Presumably, $P(S)$ declines as S increases ($dP(S)/dS < 0$). The expected damage is the probability of infringing times the injury if infringement occurs: $P(S)D$. The costs of search result from having to pay knowledgeable people to review and evaluate patent files. These can be described as wS where w is the wage rate and S represents the units of search. For society, the total costs of possible infringement are equal to the sum of the expected damage award plus the cost of avoiding infringement:

$$TC = P(S)D + wS.$$

Given a rule of strict liability, the potential infringer bears these costs and will search at a privately optimal, i.e., profit maximizing, level. This level is found where

$$dTC/dS = (dP/dS)D + w = 0$$

or where

$$w = -(dP/dS)D.$$

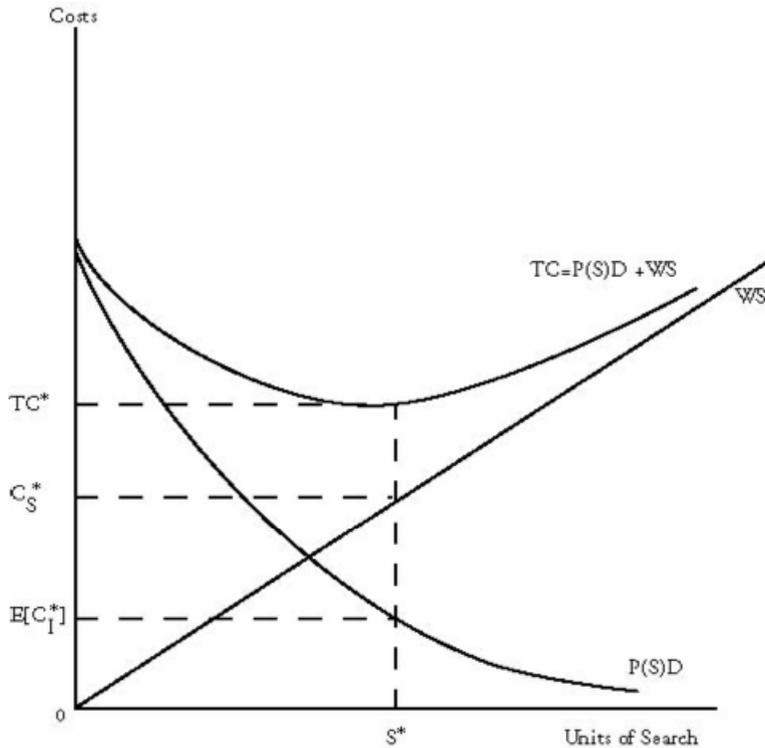
Thus, the potential infringer will expand her search efforts to the point where the marginal cost of further searching equals the marginal benefit of further searching. The left-hand side is the marginal cost of further searching as one more unit of search costs w . The right-hand side is the marginal benefit of further searching—the reduction in the probability of infringing that results from further searching (dP/dS) times the damage (D) if infringement occurs. Thus, the marginal benefit of further searching is the marginal decrease in the expected damage award.

These results are summarized in Figure 1. The expected damage, $P(S)D$, declines as search increases because the probability of infringing declines with expanded search. The cost of search, wS , increases with increases in search because the searchers have to be paid. The total cost (TC) is the vertical sum of $P(S)D$ and wS . A potential infringer will minimize her expected total cost by engaging in S^* units of search. At the minimum point on TC , the slope of wS equals the absolute value of the slope of $P(S)D$, which is the optimality condition expressed above.

68. What follows is an adaptation of the model of precaution presented in ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 347-60 (1988).

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Figure 1



Since the total costs to the potential infringer are all of the costs borne by anyone, these are also the social cost associated with possible infringement. Thus, a rule of strict liability leads to the *socially* optimal amount of search (S^*), i.e., the social cost minimizing quantity of search. Strict liability for patent infringement is allocatively efficient in the sense that the socially efficient quantity of resources is allocated to searching patent records and analyzing them for possible infringement.

As a distributive matter, all of the risk associated with possible patent infringement falls on the potential infringer. No matter how extensive her search efforts, if infringement occurs, the infringer bears all of the costs. The patentee bears none of the risk of loss due to infringement.

At the cost minimizing search level (S^*), the total cost is TC^* , which is composed of the search costs (wS^*) plus the expected infringement damages, $P(S^*)D$. Since $P(S^*)D$ is positive, this means that the optimal amount of search does not reduce the probability of infringement to zero. There is, in other words, a socially (and privately) optimal amount of infringement, which is not zero. This makes sense because reducing the probability of infringing such that $P(S)D$ is lower than $P(S^*)D$ is neither socially nor privately cost justified—it would cost more than it is worth.

This, however, raises a question about what one means by *inadvertent* or *unintentional* infringement. The potential infringer deliberately proceeds knowing full well that her search was imperfect because a perfect search would not be cost-justified. Even *ex ante*, the decisionmaker knows that the probability that his invention will infringe a valid patent is not zero. While he does not proceed knowing for certain that infringement will occur, he surely knows that it is a possibility.

B. Simple Negligence

Under a simple negligence rule, a firm engaged in R&D could protect itself from a patent infringement suit by meeting some standard of care regarding search. That is, a potential infringer has the burden of taking care not to infringe. If we define this duty in terms of search, $S = S^I$, then a potential infringer will not be liable for inadvertently infringing a valid patent if his actual search efforts are greater than or equal to S^I . In that event, no matter how great the economic loss to the patentee, the infringer will not be liable for damages. In contrast, if the infringer has not met his burden, i.e., if S is less than S^I , then the inadvertent infringer will be fully liable for the actual damages suffered. In this case, a miss is as good as a mile. If S just falls short of S^I , the innovator will be liable if his product or process infringes a valid patent.

If judicial precedent establishes a socially optimal duty of care ($S^I = S^*$) then we will have the same allocatively efficient result as we had with strict liability. The privately optimal amount of search will be S^* , which we know to be socially efficient. The major difference is that the risk of injury shifts to the patentee. No matter how extensive the economic harm associated with infringement, if S equals or exceeds S^* , the burden of the loss falls on the patentee rather than on the infringer.

The optimality of simple negligence requires the equality of the judicially determined standard of precaution, S^I , and S^* . Suppose that S^I exceeds S^* as shown in Figure 2. In that event, the potential infringer's cost coincides with TC until $S = S^I$, at which point the infringer's cost drops to wS . The potential infringer will invest in search up to S^I , which is socially excessive albeit privately optimal. Although the additional search ($S^I - S^*$) is *privately* cost justified, it is not *socially* cost justified and, therefore, is excessive. There are, of course, limits on how far past S^* the duty to search can be set. The critical value is at S^{II} where $wS^{II} = TC(S^*)$:

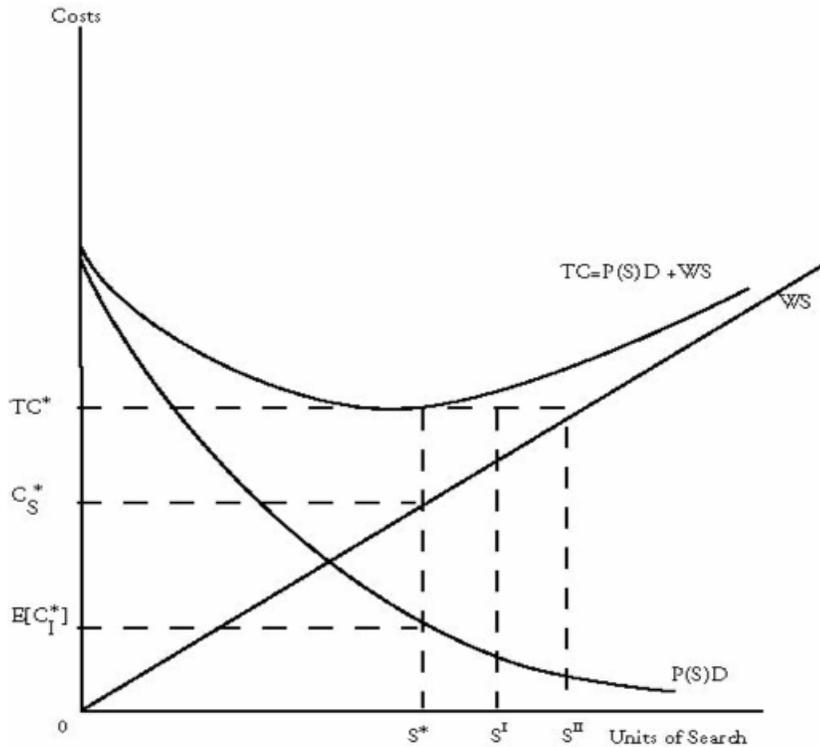
$$wS^{II} = wS^* + P(S^*)D.$$

When the duty of care is above S^{II} , the private search cost will exceed the combination of search cost and expected damage payment at a search level of S^* . Thus, if the standard of care exceeds S^{II} , the potential infringer will

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behave as though there were a rule of strict liability. In that event, the potential infringer will invest in search at the optimal level: $S = S^*$.

Figure 2



The practical problem is that under a negligence standard, courts must determine the optimal amount of search, which varies from case to case, presenting an administrative nightmare. The socially optimal value of S depends upon the values of w and D . The more expensive the search (i.e., the higher the w), the lower the socially optimal value of S . Some products or processes may have fairly low search costs, but the costs may be quite substantial for other products. For example, in the semiconductor industry, there are literally thousands of patents, which are often quite complex and, therefore, quite expensive to analyze. In fact, there is a “patent thicket” in this industry that would paralyze any R&D effort.⁶⁹ Industry participants

69. See, e.g., Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995*, 32 RAND J. ECON. 101, 102 (2001) (discussing increase in semiconductor-related patents since the early 1980s).

have responded by entering into broad cross-licensing agreements that protect them from patent infringement suits.⁷⁰

The damage due to infringement will vary from case to case as well. Obviously, the greater the value of D , the larger the socially optimal value of S will be. The more serious the possible injury, the greater the effort to avoid it will be.

In summary, a simple negligence approach to assigning fault is complicated because the cost of search will vary from case to case, as will the harm inflicted by patent infringement. This means that the socially optimal extent of search will vary from case to case. As a result, the jury would have to decide whether a specific case of inadvertent infringement should be excused because the defendant acted reasonably. This, of course, is difficult to do *ex poste* in the harsh light of day because the defendant acted *ex ante*. If juries tend to impose too severe a standard of precaution ($S > S^*$), then some resources will be wasted on excessive search.⁷¹ If the standard tends to be too low ($S < S^*$), then search will be inadequate and *permissible* (i.e., excused) patent infringement will be socially excessive.

C. Contributory Negligence

Strict liability and simple negligence impose no burden whatsoever on the patentee. If the patent is valid, the patentee's behavior does not affect liability (except in the rare case in which the patentee has engaged in conduct rising to the level of an antitrust violation or patent misuse).⁷² In some circumstances, however, a burden can be put on the patentee. For example, if a patentee has a duty to provide notice and fails to do so, he will have contributed to the infringement problem and will not be able to recover losses due to infringement should that occur.

70. *See id.* at 109.

71. For empirical evidence consistent with the common belief that juries are more pro-patent owner than are judges, see Kimberly A. Moore, *Judges, Juries, and Patent Cases—An Empirical Peek Inside the Black Box*, 99 MICH. L. REV. 365, 386-89 (2001). Another potential weakness of the negligence approach is that, as under the independent invention regime, the social cost of determining what the defendant knew and when she knew it will arise in at least some cases. To illustrate, suppose that the defendant (1) made, used, or sold the patented invention without permission, but (2) claims not to be liable because she only made, used, or sold after having conducted an adequate search that failed to turn up the patent. Once again, the court would have to determine whether the defendant independently invented or copied the invention.

72. If the parties behave in a privately optimal fashion, there is no allocative significance as either rule results in the socially optimal extent of search. The difference is that the risk of loss in instances when infringement occurs anyway falls not on the infringer with strict liability, but on the patentee with a simple negligence rule.

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The notice requirement is a duty to inform potential infringers. Suppose the notice requirement—the adequacy of the notice—is N^* and that the standard for adequate search is S^* , then the liability rules can be explained as follows:

1. If $S \geq S^*$, then the potential infringer is not negligent and cannot be liable for any harm no matter what the patentee does. Even if $N \geq N^*$, the infringer will not be liable.
2. If the patentee fails to meet his burden, i.e., if $N < N^*$, then the patentee cannot recover for infringement. Even if $S < S^*$, i.e., the potential infringer has not met his burden, the patentee cannot recover.

Imposing a notice requirement on the patentee can be seen as a means of reducing the search costs for a potential infringer. To the extent that it is relatively cheaper for the patentee to provide notice than it is for a potential infringer to search patent records, it is socially beneficial to impose notice requirements, as resources will be saved. If, however, it is relatively costly for the patentee to provide adequate notice, this may lead to a waste of resources. We should note, however, that a contributory negligence standard also poses administrative difficulties. For example, it would not seem to be easy to select the appropriate value of N , i.e., the value that will minimize social costs. This value is not unique because the cost of providing notice will vary from case to case, depending on the size of the article, its method of distribution, and other factors.⁷³ In addition, the contributory

73. In fact, the existing statutory scheme does require courts on occasion to consider whether the patentee has provided sufficient constructive notice under § 287. First, the notice itself must be legible. *See, e.g., Trussell Mfg. Co. v. Wilson-Jones Co.*, 50 F.2d 1027, 1030 (2d Cir. 1931) (holding that marking must be legible without resort to a magnifying glass). Second, it must be sufficient to “notify the public concerning the patent status of items in commerce.” *Amsted Indus.*, 24 F.3d at 185. For a sampling of cases discussing whether the patentee’s marking was sufficient, see, e.g., *Douglas Press, Inc. v. Arrow International, Inc.*, No. 95 C 3863, 1997 WL 441329, at *5-7 (N.D. Ill. July 30, 1997) (holding that the owner of patents on lottery-type card games, consisting of a master game card and individual playing cards, complied with § 287 even though it marked the master game cards only); *Shields-Jetco Inc. v. Torti*, 314 F. Supp. 1292, 1303-04 (D.R.I. 1970) (holding that marking on the inner surface of a device was appropriate, because marking on the outer surface would wear away), *aff’d on other grounds*, 436 F.2d 1061 (1st Cir. 1971); *see also Amsted Indus.*, 24 F.3d at 185 (suggesting that the patentee should have marked the center plate component it sold to customers, for the latter to assemble into the patented railroad car underframe); Steven C. Seberoff, *New Requirements in Patent Marking and Notice*, 76 J. PAT. & TRADEMARK OFF. SOC’Y 793, 799 (1994) (interpreting *Amsted Indus.* to mean that the patentee must provide a marking

negligence approach also requires a determination of the search standard, which is complicated.

We can employ familiar principles to explore the optimal decision to provide notice. For simplicity, we shall assume that if a patentee sues for lost profits suffered as a result of patent infringement, he will win and will be awarded the full lost profits. This, of course, is somewhat unrealistic because the probability of prevailing in court is not one. Moreover, there is some chance that the jury will under compensate the patentee or that the defendant will be unable to pay the full damage award. Even under these simplifying assumptions, however, there will still be the costs associated with the litigation.⁷⁴

sufficient to put “potential copyists” on notice, since the public generally would never observe the underframe of a railroad car). Third, as noted above the patentee must make reasonable efforts to ensure that its licensees comply with the marking requirement. *See Maxwell v. J. Baker, Inc.*, 86 F.3d 1098, 1111-12 (Fed. Cir. 1996).

The interplay of these requirements can be complex. Consider, for example, the case of a patent on a component that is used in the interior of a common product, such as a television set. In light of the above authorities, does the patent owner have a duty to ensure that its licensee (the manufacturer of the completed television set) mark the outside of the set, so as to notify every potentially liable party in the chain of distribution (including not only the manufacturer of the television, but also distributors, retailers, and consumers)? Or is it sufficient for the patentee to mark the components themselves, on the theory that potential copiers of the component will take the set apart to view the component?

Finally, when marking the product itself is not feasible (for example, because of the product’s size) the patentee may mark the product packaging instead. *See* 35 U.S.C. § 287(a) (1994). Courts therefore sometimes must determine whether marking the product is feasible and, if not, whether the marking on the package is sufficient. *See, e.g.*, *Sessions v. Romadka*, 145 U.S. 29, 49-50 (1892) (noting uncertainty over whether the patentee could have legibly marked the smaller sizes of its patented trunk catches, and stating that “in a doubtful case something must be left to the judgment of the patentee”); *Rutherford v. Trim-Tex, Inc.*, 803 F. Supp. 158, 162-64 (N.D. Ill. 1992) (discussing various factors that are relevant to this determination, including the size of the article, the expense of marking the article in comparison with the expense of marking its packaging, whether marking would deface the product, the custom of the industry, and whether the article bears any other marking). For further discussion of the case law on marking sufficiency, see 7 CHISUM, *supra* note 6, §§ 20.03[7][c][iii]; 1 ETHAN HORWITZ & LESTER HORWITZ, PATENT LITIGATION: PROCEDURE & TACTICS, §§ 1.02[4][d][vi], [ix] (2001); Oppedahl, *supra* note 19, at 213-15; Jessica Siegel, Comment, *The Patent Marking & Notice Statute: Invitation To Infringe or Protection for the Unwary?*, 36 HOUS. L. REV. 583, 597-600 (1999).

74. Unless the infringement is willful, an aggrieved patentee must pay his own costs of litigation—attorneys’ fees, expert fees, and so on. *See Blair & Cotter, supra* note 18, at 7, 50-51. Moreover, the cost of distracting key employees in the litigation process is similarly uncompensated. And in some cases, the cost to the patentee of detecting infringement may be substantial; *cf. Wanlass v. Gen. Elec. Co.*, 148 F.3d 1334, 1341 (Fed. Cir.

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We shall denote the litigation costs as L . These costs will only occur if infringement occurs and this, of course, is not certain. Let p represent the probability that a latecomer will independently discover and market the same invention. Since we are dealing with inadvertent infringement, we assume that the latecomer will not go to market (and thereby infringe a valid patent) if she knows that a valid patent already exists. The patentee can reduce the probability of inadvertent infringement by investing in notice N at a cost of $C(N)$. From the patentee's perspective, the question is what value of N will minimize the costs of litigation and notice:

$$TC = p(N)L + C(N).$$

The optimal value of N solves the first-order condition

$$dTC/dN = Ldp(N)/dN + dC(N)/dN = 0.$$

The optimal value of N occurs where the marginal cost of additional notice $dC(N)/dN$ equals the marginal benefit of reducing the expected litigation costs, $Ldp(N)/dN$. This does not mean that N is necessarily positive. It can be optimal for the patentee to invest no resources in notice, i.e., it is possible for $N^* = 0$.⁷⁵

IV. STRICT LIABILITY WITH NOTICE OR KNOWLEDGE AS A PRECONDITION TO DAMAGES RECOVERY

Yet another variation on the theme would be to apply a strict liability standard, but to condition the patentee's ability to obtain a remedy upon the infringer's actual knowledge or receipt of notice that his conduct infringes the plaintiff's patent. This framework is similar to the contributory negligence standard discussed above, except that the defendant would be liable for infringement regardless of how much (or how little) search he engaged in, if he made, used, or sold the patented invention with knowledge or after receipt of notice. In the following sections, we provide some reasons why this type of system—a form of which is embodied in our current Patent Act—may be superior to a “true” strict liability system. We also suggest, however, that the optimal form of such a rule is elusive, thus

1998) (Rader, J., dissenting) (arguing that laches should not bar a patent owner from enforcing a patent against the defendant, despite evidence that the burden of policing potential infringers was in this case excessive).

75. This will occur if $p(N)L$ evaluated at $N = 0$ lies below $p(N)L + C(N)$ for all values of $N > 0$. What drives this outcome are large fixed costs of providing notice. That is, the cost of notice function is of the form $C(N) = a + \omega(N)$, where a is a fixed cost that can be avoided if no notice is given (i.e., if $N > 0$). If a is sufficiently large, it is possible for $p(N)L$ at $N = 0$ to be below $p(N)L + C(N)$ for all values of $N > 0$.

leaving open the question of whether section 287 should be amended in any significant way.

A. The Relevant Considerations⁷⁶

We begin our analysis of a “pure” versus modified strict liability regime by assuming that A is the leader in a patent race between A and B. A therefore must decide (1) at time t_1 whether to invest in creating a new invention which, if invented, will be patented and marketed at time t_2 ; and (2) at time t_2 whether to attempt to put B on notice of A’s patent.⁷⁷ Whether or not A is obligated to provide notice to potential infringers, A will choose to do so if the expected benefit—deterring infringement, which otherwise may cause A to incur uncompensated losses—outweighs the expected cost. As above, A will invest in providing notice up to the point at which $dC(N)/dN = -Ldp(N)/dN$.⁷⁸ We assume further that if B receives actual notice of the patent at time t_2 , B will decide not to invest in creating the same invention, and that her expected return will be zero. Unless B can be sure of receiving actual notice of every relevant patent, however, at time t_2 B must decide, if she has not yet received any actual notice, whether to conduct her own independent search of the prior art before investing in the new invention. As discussed above, we would expect B to search up to the point at which $w = -(dP/dS)D$.⁷⁹

On these assumptions, the total social cost of infringement would include $p(N)L + C(N) + w(S)$. Ideally, a social planner would construct a rule that would minimize this cost, but this is easier said than done for several reasons. The first is that the values of $w(S)$ and $C(N)$ are likely to be related: the more that A invests in notice, the less that B will need to invest in search, and vice versa. Unless we know *how* these variables are

76. The analysis presented in this subsection is adapted from our discussion in Blair & Cotter, *supra* note 18, at 59-66.

77. A further variation on this model might involve A’s decision whether to provide notice at time t_1 , that is, during the R&D stage. Although a public disclosure at this time might reduce A’s expected return from invention, because the disclosure will count as prior art for purposes of novelty and the statutory bar, it may reduce B’s expected return as well. See 35 U.S.C. § 102(a)-(b) (1994). If B is the straggler in a patent race with A, disclosure might increase A’s net payoff by inducing B to drop out of the race altogether. See generally Douglas Lichtman et al., *Strategic Disclosure in the Patent System*, 53 VAND. L. REV. 2175 (2000) (outlining strategic reasons for early disclosure); Gideon Parchomovsky, *Publish or Perish*, 98 MICH. L. REV. 926 (2000) (suggesting that the benefit of eliminating potential competitors through early disclosure outweighs the risk of borrowing one’s own attempt to secure a patent). Adding this complication would not affect the analysis above, however, and we therefore omit it from our discussion.

78. See Part III.C *supra*.

79. See Part III.A *supra*.

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related, however, any effort to reduce social cost will be at most an educated guess. A second problem is that these variables are likely to differ, both in absolute terms and in relation to one another, from one case to another, thus further complicating the task of crafting an optimal rule to cover all situations. Third, it is conceivable that in some cases the choice of the “wrong” rule could deter invention on the part of either A or B. For example, A might be deterred if the cost of requiring A to notify potential infringers is so high as to make it pointless for A to seek any damages for conduct occurring prior to the commencement of litigation, if the possibility of recovering such pre-notice damages, in addition to (1) injunctive relief and (2) post-notice damages, is a necessary component of the patent incentive system.⁸⁰ For analogous reasons, B might be deterred though, if she had more complete information, she would know that in some cases there was no serious risk of infringement.⁸¹

80. See Blair & Cotter, *supra* note 18, at 62 (discussing this issue).

81. In our article on patent damages, we provide the following heuristic example of how the choice of a pure strict liability rule might deter B from investing in invention in some cases. Under such a rule, B’s expected return if she does not search is

$$E[R] = \pi_B - r(D + s + L_B),$$

where π_B is B’s expected profit from marketing her invention; r is B’s subjective probability that her invention will infringe a valid patent and that she will be sued successfully; D represents the expected damages award that B will incur if she infringes; s represents certain sunk costs; and L_B is B’s litigation costs if she is sued. If B searches, her expected return is equal to the probability that her invention does not infringe a valid patent ($1 - r$), times the profit that she could earn by marketing her invention minus the cost of the search. This can be written as

$$E[R] = (1 - r)\pi_B - c_B,$$

where c_B is B’s cost of conducting a search (for example, by reviewing existing patents). B will search only if the expected return from doing so exceeds the expected return without a search:

$$(1 - r)\pi_B - c_B > \pi_B - r(D + s + L_B).$$

If A and B are equally efficient manufacturers of the product that embodies the patent, π_B will equal D , because π_B will equal A’s lost profit. In that event, a search will occur provided that $c_B < r(s + L_B)$. If A is more efficient than B, the damages award (D) should exceed B’s profit (π_B). In that event, a search will be optimal if $r(\pi_B - D) + c_B < r(s + L_B)$. Since $(\pi_B - D)$ is negative, $r(\pi_B - D) + c_B < c_B$, and a search is more likely than when B expects her potential competitor A to be only equally efficient.

Depending on the values of some of these variables, B may decide not to undertake investment in the new invention even though, if she had complete information, she could do so safely. For example, suppose that B expects a hypothetical competitor’s profit on the sale of products embodying the contemplated invention to be high in comparison with B’s own expected profit; that the probability of independent discovery is low; and that the probability of infringement, the cost of searching, and expected litigation costs are moderately high. For example, assume that π_B is \$2,000; D is \$10,000; r is .50; c_B is \$1,000; L_B is \$1000; and, for simplicity, that B would incur no sunk costs prior

What, then, can we say about the relative merits of a pure strict liability system versus a system that conditions the recovery of damages upon the provision of notice? Our intuition is that a rule requiring the patentee to provide *some* sort of notice is preferable to one that does not. First, we suspect that in many cases the cost of searching will be substantial, given both the length of the patent term⁸² and the number and complexity of patents that may be relevant to a given undertaking. Even if B has an incentive to conduct some search anyway—for example, to reduce the risk of a lawsuit that might lead only to injunctive relief—creating an incentive for more extensive searching may be socially wasteful if A can reduce the likelihood of inadvertent infringement at lower cost.⁸³ The second, and related, point is that A may be capable of doing precisely that, at least if some form of constructive notice is deemed sufficient.⁸⁴ Third, as long as the notice requirement is not too severe, it seems unlikely that some restriction upon A's ability to recover damages for pre-notice conduct will have a substantial impact upon A's incentive to invent. The empirical evidence to date suggests that the patent incentive may be relatively important only in a minority of industries;⁸⁵ even in these industries, the ability to recover *all* damages proximately caused by the infringement, including those that accrue prior to notice, may not be material. On the other hand, given the existing state of our knowledge, and the possibility that the ability to recover damages for conduct occurring prior to the commencement of litigation *may* provide a significant incentive for inventive activity in

to the entry of an injunction. Absent notice from A, B's expected payoff if she does not search is $(2,000) - (10,000 + 1,000)(.50) = -\$3,500$, whereas her expected payoff if she searches is $(2,000)(1 - .50) - 1,000 = \0 . B therefore prefers not to invest in the invention at all, even though half the time she would create a marketable, noninfringing product. *Id.*

82. The standard patent term runs from the date of issuance to a date twenty years after the date on which the patent application was filed. *See* 35 U.S.C. § 154(a)(2) (1994). As Mark Lemley has pointed out, however, about two-thirds of patents are allowed to lapse before their termination date, for failure to pay patent maintenance fees. *See* Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1503-04 (2001).

83. *See* Blair & Cotter, *supra* note 18, at 65-66.

84. *See id.* at 66. Of course, the question arises whether some form of constructive notice ought to be sufficient; maybe actual notice should be required in all cases. Balanced against this possibility, however, are the concerns that (1) at least in some cases the ability to recover full damages may be material to the patent owner's incentives, and (2) the cost of detecting and pursuing infringers can further eat into that incentive. The problem is that both patentee and infringer face information costs if the law requires each to discover the other's existence. Although we can make an educated guess concerning the best way to resolve this problem while maintaining the proper incentives, ultimately the problem may not admit of any firm conclusions.

85. *See id.* at 79 n.345.

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some cases, we do not recommend doing away with such damages altogether; far from it.⁸⁶ We do suspect, however, that the system may be able to accommodate the competing interests we have identified by requiring some form of notification as a condition for recovering pre-litigation damages.⁸⁷

The precise form that a modified strict liability rule should take nevertheless eludes economic analysis, for the reasons suggested above. Perhaps in some instances the principal benefit of economic analysis may be to tell us how much we *don't* really know about things that seem familiar. In any event, in the following section we point out some of the advantages and disadvantages of various types of notice rules—including the one embodied in section 287—under a modified strict liability standard. At all times, however, we remain aware that the relevant costs and benefits cannot be precisely quantified.

B. Section 287 and Other Alternatives

If we wish to create a system in which patent owners are encouraged to invest, to some degree, in providing notice, there is still a variety of ways to implement such a system. At one extreme, one could argue that since patents are, by definition, public records, potential infringers are always on constructive notice; therefore, the patent owner should always be entitled to recover damages attributable to infringing conduct. This was the perspective embodied in the earliest patent acts in this country,⁸⁸ and it

86. *See id.* at 66, 79.

87. In our patent damages article, we also suggest two other, less significant reasons for some form of notice requirement:

A third consideration is that placing the burden on the patentee in effect allows patentees to signal whether they are interested in maximizing their potential damages recovery. Those who choose not to put potential infringers on notice may, in some cases, induce some degree of pre-injunction infringement; but if the losses attributable to this interim infringement have no effect on the patentee's ex ante incentives, this interim infringement benefits the public by reducing price and increasing output. Fourth . . . the case for allowing nonmanufacturing patent owners to recover lost profits on sales of goods that compete with infringing products is a close one. To the extent there are good reasons to permit this recovery, however, those reasons are significantly weaker if the infringer is not aware that his product infringes (and the potential anticompetitive effect of this rule is more serious).

Id. at 66.

88. *See Nike, Inc. v. Wal-Mart Stores, Inc.*, 138 F.3d 1437, 1443 (Fed. Cir. 1998) (stating that, under the early case law, "patents were public records and all were 'bound to take notice of their contents'" (quoting *Boyden v. Burke*, 55 U.S. (14 How.) 575, 582 (1852)); 7 CHISUM, *supra* note 6, § 20.03[7][c][i] (noting that the Patent Act imposed no

is not a trivial position; requiring the public disclosure of patented inventions surely reduces the cost of searching for those inventions. That cost may still be substantial, given the sheer volume and complexity of existing patents. The question therefore arises whether conditioning an award of damages upon compliance with a more rigorous notice standard makes sense, given that (1) the more costly the standard is to comply with, the greater the potential is for decreasing the patent owner's incentive to invent; and (2) the less costly notice is in comparison with search, the greater the potential is for reducing social costs and having a chilling effect upon the inventive efforts of latecomers.

Section 287 of the Patent Act attempts to resolve these issues by conditioning the patent owner's recovery of damages upon his provision of actual or (by marking) constructive notice to the infringer,⁸⁹ but the way in which the statute applies in several common situations is problematic. Notwithstanding the statute's intended purpose of "helping to avoid innocent infringement,"⁹⁰ it may sometimes leave "innocent" infringers vulnerable to substantial damages liability. At the same time, section 287 allows knowledgeable (even willful) infringers to remain immune from damages liability, unless and until the patent owner provides them with actual notice of information already in their possession.

As for innocent infringers, as noted above, the statute does not apply unless the patentee or his licensee manufactures products covered by the patent.⁹¹ As a result, an infringer of a process patent—or of any patent that the owner holds idle—can be liable for all damages proximately caused by the infringement, even if she had no notice prior to the filing of the complaint that the invention was patented.⁹² Moreover, even as to non-idle, nonprocess patents, the mere fact that the patentee has marked his articles in conformity with section 287 is no guarantee that an innocent infringer will actually encounter the mark—thus leaving open the possibility that an "innocent" defendant who independently discovers an invention already subject to patent protection can be liable for substantial damages, even if she ceases infringing immediately upon receipt of actual notice. Taken to

marking requirement until 1842, and did not condition the recovery of damages upon compliance with actual notice or marking until 1861).

89. See 35 U.S.C. § 287 (1994). The Federal Circuit has "caution[ed] . . . that once marking has begun, it must be substantially consistent and continuous in order for the party to avail itself of" section 287. *Am. Med. Sys.*, 6 F.3d at 1537.

90. *Nike*, 138 F.3d at 1443.

91. See *supra* notes 16-18 and accompanying text.

92. See *id.* But see *supra* note 11 (noting that actual knowledge or notice is a precondition for recovering damages for the use, sale, offer to sell, or importation of an unpatented product of a patented process).

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its logical conclusion, this principle would suggest that a patent owner could comply with section 287 by making, marking, and marketing just a few “token” articles. In such a case, his lost profits probably would be minimal, but the infringer could be liable for a reasonable royalty—and in some cases, lost profits on the sales of other products the patentee marketed.⁹³ For that matter, a literal reading of the statute would allow a patent owner who uses the patented product solely in his own business, and does not sell it to third parties, to recover damages from the beginning of the infringement, as long as he properly marks the patented product, even though the product never makes its way to the marketplace and the infringer has no way of encountering it. In such a case, compliance with the marking requirement is an empty formality in light of the statutory policy, but could have serious consequences in terms of the appropriate remedy.⁹⁴

93. See Blair & Cotter, *supra* note 18, at 29-37.

94. See 7 CHISUM, *supra* note 6, § 20.03[7][c][ii]. Chisum notes:

Section 287 literally specifies “making *or* selling,” and it can be argued that marking is required even if the patentee neither sells nor authorizes others to sell (e.g. when a patent owner makes and uses a patented machine and sells only the unpatented products thereof), but that literal reading is contrary to the rationale behind the statute . . . to wit, to protect against the deception of the public by the distribution of unmarked patented articles.

Id. As Chisum notes, the Supreme Court has never expressly decided the issue. See *id.* at § 20.03[7][c][i] (noting that the Court raised but did not decide this issue in *Coupe v. Royer*, 155 U.S. 565 (1895)). In at least one case, however, a court appears to have applied the statutory language literally and therefore limited a damages recovery to a patent owner that failed to mark products it used exclusively in its own business operations. See *T.D. Williamson, Inc. v. Laymon*, 723 F. Supp. 587, 606 (N.D. Okla. 1989), *aff’d mem.*, 923 F.2d 872 (Fed. Cir. 1991) (cited in Edward W. Remus et al., *Prerequisites to Recovery of Damages: Importance of Marking and Notice of Infringement*, CA15 ALI-ABA 413, 427 (Nov. 9, 1995)); see also Siegel, *supra* note 73, at 606 (appearing to advocate the literal approach); Voelzke, *supra* note 16, at 323-24 (suggesting that damages would not accrue until the patent owner marked under these facts, but arguing that this result does not advance the policy of the statute).

Another situation in which an innocent infringer may nevertheless be liable for pre-notice damages would occur when a patentee licenses another to make and sell products covered by the patent; he expends reasonable efforts to ensure the licensee’s compliance with the marking statute, see *Maxwell v. J. Baker, Inc.*, 86 F.3d 1098, 1111-12 (Fed. Cir. 1996) (discussing “reasonable efforts” requirement); but these efforts are unsuccessful, such that the licensee markets unmarked goods. Presumably, an innocent infringer could be liable for pre-notice damages under these circumstances. See *Moore & Nakamura*, *supra* note 19, at 100 (arguing that this outcome is probably correct); cf. *Analytical Controls v. Am. Hosp. Supply Corp.*, 518 F. Supp. 896, 899 (S.D. Ind. 1981) (holding that a patent owner was not barred from recovering damages, in a case in which its licensee properly marked and sold the patented product in bulk to a third party, who then re-

A second difficulty is that the statute partially immunizes from damages liability some persons who *knowingly* infringe patents, but who have not received actual or constructive notice prior to the filing of the complaint.⁹⁵ At first blush, this rule seems troubling for two reasons. First, requiring the patentee to provide actual notice to knowing infringers imposes an unnecessary cost, although we probably should not overemphasize this point. Providing actual notice to infringers of whom the patentee is aware is not costly,⁹⁶ and (at least in some cases) neither is the provision of constructive notice by compliance with the marking statute.⁹⁷ A second problem is that the rule provides knowing infringers with a perverse incentive to continue infringing up until the receipt of actual notice,⁹⁸ but this point too should not be overstated. The cost of complying with an injunction forbidding future use of an invention can be high, particularly if the defendant has incurred significant sunk costs in connection with the use of the infringing product or process. Persons with knowledge of the patent therefore already have some incentive not to infringe, even absent actual or constructive notice.

Moreover, in defense of the current rule, one can imagine that holding knowing infringers liable for damages accruing prior to their receipt of actual or constructive notice could itself have some undesirable consequences. First and foremost is the possibility that an “actual knowledge” standard might require courts and litigants to bear substantial administrative costs in determining whether the defendant in a particular case had the requisite state of mind.⁹⁹ Furthermore, an actual knowledge rule might

packaged and sold it without marking) (cited in Moore & Nakamura, *supra* note 19, at 92-93).

95. *See Nike*, 138 F.3d at 1446 (“In determining whether the patentee marked its products sufficiently to comply with the constructive notice requirement, the focus is not on what the infringer actually knew, but on whether the patentee’s actions were sufficient, in the circumstances, to provide notice in rem.”); *Amsted Indus. v. Buckeye Steel Castings Co.*, 24 F.3d 178, 187 (Fed. Cir. 1994) (“For purposes of section 287(a), notice must be of ‘the infringement,’ not merely notice of the patent’s existence or ownership. Actual notice requires the affirmative communication of a specific charge of infringement by a specific accused product or device.”).

96. *But see supra* note 74 (noting that the cost of locating unknown infringers may be burdensome).

97. *But see supra* note 73 (noting some of the problems in interpreting precisely what the marking statute requires, as well as the burden of ensuring compliance on the part of licensees).

98. *See Blair & Cotter, supra* note 18, at 65; Siegel, *supra* note 73, at 605-06.

99. In an analogous context, the Federal Circuit has cited enforcement costs as a reason to require that actual notice must come from the patentee and to reject a rule under which notice from someone closely associated with the patentee would suffice:

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give some potential infringers an incentive to avoid searches that could lead to the acquisition of actual knowledge—unless the rule were further modified to penalize infringers who “know or should have known” of the patent’s existence, which then would give rise to further administrative costs.¹⁰⁰ Perhaps this incentive too is minimal, in light of the availability of injunctive relief, as remarked above.¹⁰¹ In addition, if an actual knowledge standard were coupled with the existing constructive notice rule, the task of determining whether the defendant had actual knowledge would arise only in cases in which the patent owner failed to mark (or in cases involving process and idle patents, if the rules relating to these patents were also amended), which may be a minority of cases—although under such a system the incentive to mark would also be reduced, thus making the ultimate consequences even more difficult to predict.

Even if a rule that exempts knowing infringers from damages liability until the receipt of actual or constructive notice is generally sound, the application of this rule in certain recurring situations is nonsensical. To illustrate, suppose that the patent owner proves that the infringer began infringing on January 1, 1998; that he provided actual or constructive notice to the infringer on January 1, 1999; and that the infringement was willful¹⁰²

[A] looser notification rule would present notable enforcement problems. Courts would have to decide the degree of association sufficient to satisfy the rule. Must the notifying party control the patentee, or simply have an interest in the patentee? Indeed, how much control or interest would suffice? Agency principles would not likely ease this problem because the notifying party would not likely even purport to act on behalf of the patentee. Accordingly, a looser rule would both frustrate the purpose of notification and present difficult, if not unworkable, enforcement problems.

Lans v. Digital Equip. Corp., 252 F.3d 1320, 1327 (Fed. Cir. 2001). The problem is also analogous to the hypothetical problem that we encountered above in our discussion of the independent discovery defense, *see supra* notes 48-52 and accompanying text, although in the present context the difficulties might not be as severe. The incentive for defendants to cheat by feigning independent discovery would be less substantial than with an independent discovery defense, because both cheating and non-cheating defendants would be enjoined from future use and would be liable for damages that occur after receiving notice.

100. *But see infra* notes 102-107 and accompanying text (noting some common situations in which the Patent Act requires the patentee to bear analogous costs anyway, in order to prevail on its substantive claim).

101. *See* Part IV.A *supra*.

102. In *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 826-28 (Fed. Cir. 1992), the Federal Circuit listed nine factors that may “assist the trial court in evaluating the degree of the infringer’s culpability and in determining whether to exercise its discretion to award enhanced damages and how much the damages should be increased.” These include:

from the very beginning, i.e., from January 1, 1998. On these facts, the patent owner is entitled to damages for the period beginning January 1, 1999, and a court may increase these damages on account of the infringer's willfulness—but the patent owner is not entitled to damages for the year 1998, despite the fact that the evidence demonstrates the defendant's willfulness during that period.¹⁰³ Applying the actual and constructive notice rules in a case like this does not reduce administrative costs—proof of what the infringer knew and when she knew it is essential to a claim of willful infringement—and permits the knowing infringer to escape some damages liability, even though the purpose of the notice requirement is to protect innocent infringers. Or consider a case in which the patent owner sues the defendant for contributory infringement or for actively inducing another person to infringe. In both cases, in order to prove his substantive claim, the patent owner must prove that the defendant knew or should have known that her activity would cause another to infringe the patent,¹⁰⁴ but the patent owner may not recover damages for any

“whether the infringer deliberately copied the ideas or design of another;” “whether the infringer, when he 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;” “the infringer's behavior as a party to the litigation;” “defendant's size and financial condition;” “closeness of the case;” “duration of defendant's misconduct;” “remedial action by the defendant;” “defendant's motivation for harm;” and “whether defendant attempted to conceal its misconduct.” *Id.* at 826-28. *See also* *State Indus. v. Mor-Flor Indus.*, 883 F.2d 1573, 1581 (Fed. Cir. 1989) (stating that the “standard for proving willfulness . . . is ‘whether, under all the circumstances, a reasonable person would prudently conduct himself with any confidence that a court might hold the patent invalid or not infringed,’” and that “[a]ctual knowledge [of the patent] is not required”) (quoting *Ryco, Inc. v. Ag-Bag Corp.*, 857 F.2d 1418, 1428 (Fed. Cir. 1988)).

103. These are, in essence, the facts and outcome of the *Amsted* case. *See Amsted Indus.*, 24 F.3d at 181-88.

104. Contributory infringement occurs when a person sells a material component of a patented invention, “knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use.” 35 U.S.C. § 271(c) (1994); *see also* *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469 & n.4 (Fed. Cir. 1990) (stating that § 271(c) makes “clear that . . . proof of a defendant's *knowledge* . . . that his activity cause infringement was necessary to establish contributory infringement,” and that the plaintiff must prove that the defendant has “knowledge of the patent which proscribed that use”). Active inducement, which in some cases may overlap with contributory infringement, occurs when a person intentionally causes another to infringe. *See* 35 U.S.C. § 271(b) (1994); *Hewlett-Packard*, 909 F.2d at 1469 (requiring “proof of actual intent to cause the acts which constitute the infringement”). As in the former case, the plaintiff must prove that the defendant acted with knowledge. *See* *Manville Sales Corp. v. Paramount Sys.*, 917 F.2d 544, 553 (Fed. Cir. 1990) (stating that “the alleged infringer must be shown to have *knowingly* induced infringement”); 4 CHISUM, *supra* note 6, § 17.04[2]

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period preceding the defendant's receipt of actual or constructive notice.¹⁰⁵ Once again, this result is difficult to square with the policy underlying section 287. If one reason for requiring actual or constructive notice is to avoid the expense of having to prove the defendant's state of mind, shouldn't this requirement be waived in cases in which the plaintiff must prove that state of mind in order to prevail on its substantive claim?¹⁰⁶ In these cases, the evidence that the defendant had knowledge may be clear, and yet a literal reading of the statute can result in an avoidance of damages liability.¹⁰⁷

(stating that the "requirement that the defendant have some knowledge of the patent as well as the nature of his acts and their consequences would seem to apply equally to Section[s] 271(b) and 271(c)").

105. See *Amsted Indus.*, 24 F.3d at 180, 184-88 (holding that plaintiff was not entitled to damages against a *contributory infringer* for the period of time preceding the contributory infringer's receipt of actual or constructive notice).

106. One can imagine other cases in which there will be little doubt that the defendant had actual knowledge of the patent. For example, consider the case of a terminated licensee who continues using the now-unlicensed patent. Surely this type of defendant knows what she is doing—and yet she too will escape damages liability until the receipt of actual or constructive notice, even though she is likely to be a willful infringer. See *Loral Fairchild Corp. v. Victor Co. of Japan*, 906 F. Supp. 813, 817 (E.D.N.Y. 1995) (Rader, J., sitting by designation) (cited in Siegel, *supra* note 73, at 602-03); *Gen. Elec. Co. v. George J. Hagan Co.*, 40 F.2d 505, 507 (W.D. Pa. 1929) (cited in McKeon, *supra* note 19, at 451).

Even worse, consider the case of a defendant who is sued for patent infringement, ceases her use in response, and then resumes infringing the very same patent. Under a strict interpretation of the notice requirement, the defendant avoids incurring any damages liability for her second round of infringement, until the receipt of actual or constructive notice. Of course, if the first infringement resulted in the entry of an injunction against the defendant, she may be liable for contempt of court when she resumes infringement; so perhaps this last example is more hypothetical than real. Moreover, in the only reported decision we are aware of discussing this fact pattern, the court stated that the defendant's receipt of the complaint filed in response to first bout of infringement constituted sufficient notice. See *Warner v. Tenn. Prods. Corp.*, 57 F.2d 642, 646 (6th Cir. 1932). As McKeon notes, however, the *Warner* court took the view that actual knowledge sufficed under section 287, and this is not the standard under current law. See McKeon, *supra* note 19, at 453-54 (arguing, however, that current law would be better if it followed *Warner*). Thus, if this issue were to arise today in a case in which the previous act of infringement did not result in the entry of an injunction, we think there is a good chance that a court would strictly apply the actual notice standard.

107. Another possible consequence of the applicability of section 287 to products but not processes is that the statute may affect the way in which patent attorneys draft and prosecute patent applications and litigate patent cases. As noted above, when a patentee alleges that a defendant has infringed both the product and process claims of a single patent, the patentee's manufacture or sale of unmarked products covered by the patent precludes him from recovering pre-notice damages relating to either the product or process

At the end of the day, just as we are reluctant, in the absence of strong empirical evidence on the incentive effects on patents, to advocate the adoption of a full-blown strict liability system, we are hesitant to propose the adoption *tout court* of an “actual knowledge” standard. We can nevertheless suggest some reforms that would make the current system more coherent. The first set of reforms relates to some specific situations in which an actual knowledge standard would make sense. The second relates to process and idle patents, the third to constructive notice.

A first set of reforms would entail adopting an actual knowledge standard in a few discrete situations in which the policies that otherwise may favor an actual or constructive notice standard do not apply. In light of our discussion above, we think it is relatively easy to justify a rule permitting the patent owner to recover damages from a knowing infringer when the infringer’s state of mind is necessarily at issue in light of the nature of the claims (e.g., willful or contributory infringement).¹⁰⁸ In addition, one could probably specify certain other cases in which it might make sense to apply an actual knowledge standard, such as when the infringer is a former

claims. *See supra* note 14. But what if the patentee sues only for infringement of the process claim, even though the defendant’s product reads on a product claim of the same patent? *Compare* Oppedahl, *supra* note 19, at 220-21, 226 (arguing that the patentee may be able to recover pre-notice damages for infringement of the process claim under these circumstances), and Georgia E. Kralovic, Comment, *The Principle of Fair Notice: Is It Prudent Guidance for the Future of Patent Law?*, 26 PEPP. L. REV. 89, 113 (1999) (same), and Voelzke, *supra* note 16, at 331 (same), with Remus et al., *supra* note 94, at 427 (suggesting the opposite). Even if Oppedahl, Kralovic, and Voelzke are correct, could the defendant force the issue, by asserting a counterclaim for a declaratory judgment of noninfringement as to the product claim? Having once asserted a claim involving a product claim, could a patentee amend his complaint or dismiss the product claim, and recover damages for only the process claim? *See* Voelzke, *supra* note 16, at 335 (raising this issue).

Another possible strategic maneuver involves an applicant who divides his original patent application into two, one covering a product, the other a process. Suppose that he subsequently sells unmarked products covered by the product patent, and that the defendant infringes both patents. If the patentee sues for infringement of both patents, can he recover pre-notice damages for infringement of the process patent? *Compare* James M. Markarian, *Can the Marking Requirements for a Patented Article Be Circumvented by Obtaining a Process Patent?*, 17 J. PAT. & TRADEMARK OFF. SOC’Y 365, 370 (1997) (arguing that the answer is probably no), with Oppedahl, *supra* note 19, at 221 n.70 (suggesting that the answer may be yes). What should the outcome be if there were two applications to begin with, or if the patentee sues for infringement of the process patent only? *See* Voelzke, *supra* note 16, at 336-37 & n.85 (noting the uncertainty). Yet another consequence of the statute is that it may encourage the parties to argue counterintuitive positions—with the patentee arguing that his own products do not embody the patent, and the defendant arguing that they do. *See* Moore & Nakamura, *supra* note 19, at 94-95.

108. *See supra* notes 102-107 and accompanying text.

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licensee under the patent at issue (and therefore *must* have had actual knowledge).¹⁰⁹ More controversially, one might consider adopting an actual knowledge standard when the possibility of liability for “innocent” infringement seems particularly troubling. In previous work, we have suggested that such a standard might make sense when patent owners seek damages against nonmanufacturing infringers, that is, against sellers and users who may lack knowledge that the manufacturer has infringed another’s patent by manufacturing the product without authorization.¹¹⁰

A second set of reforms would center around patented processes and idle patents. Under the current system, there is some risk that strict liability will deter potential defendants from undertaking inventive activity (for example, in industries in which process patents predominate, such as biotechnology), or otherwise lead to socially wasteful searches.¹¹¹ One possible response would be to condition damages liability in these cases upon the receipt of actual notice. Balanced against this recommendation, however, is the possibility (however slight) that the resultant reduction in the patent owner’s expected return could have an impact upon his incentive to invent (particularly, perhaps, when we factor in the cost of detection). In addition, if there is no tangible product to mark, constructive notice may not be an option¹¹² and the cost of providing actual pre-infringement notice to all potential infringers is likely to be high. Perhaps no reform is necessary with respect to these cases, if they represent only a small fraction of all patent disputes—or if, in the case of process patents, it is relatively uncommon for someone to infringe a process patent and *not* a related product patent as well.¹¹³ In this regard, further empirical research on

109. *See supra* note 106.

110. *See Blair & Cotter, supra* note 33, at 25 n.87. As we argued in that article, the need to extend liability from infringing manufacturers to mere sellers and users in order to preserve the patentee’s incentives is somewhat attenuated, even if the latter would have a right of indemnification from the former. If so, the adoption of an actual knowledge standard with regard to sellers and users may help to reduce the likelihood that the latter will be victimized by a fly-by-night manufacturer. *See id.* at 15-27. On the other hand, a review of the reported decisions disclosed relatively few cases in which mere sellers and users were ordered to pay infringement damages. *See id.* at 3-4.

111. *See supra* note 81 and accompanying text.

112. *But see supra* note 11 (noting that a process patent owner can constructively notify users, sellers, offerors, and importers of unpatented products made by the unauthorized use of the process, by marking with the process patent number all products made by the authorized use of the process and sold, offered, or imported into the United States); *infra* note 113 (suggesting another possibility).

113. *But see supra* note 107 (noting that, under current law, patent attorneys may have an incentive to favor drafting process over product claims, to draft separate product and process patents for the same invention, or in some cases to assert only process claims

the incidence and magnitude of damages awards in cases involving process-patent and idle-patent infringement might be a helpful addition to the literature.

A third set of reforms would target some of the inconsistencies in the current marking regime. One obvious change would be to amend § 287 so as to clarify that marking applies only when the patent owner *sells* a product embodying the patent, and not when he only makes and uses the product for his own internal business.¹¹⁴ Even if one takes the view that an actual knowledge standard would be preferable to strict liability, there is no

at trial). To reduce these incentives for strategic behavior, Voelzke suggests eliminating § 287's disparate treatment of product and process claims by adopting a rule that would preclude the patent owner from recovering pre-notice damages if he "place[d] into the hands of the public unmarked articles from which the public can learn the claimed invention." Voelzke, *supra* note 16, at 341. In other words, if the article is one which teaches the claimed invention—whether a process or a product—the patent owner could recover infringement damages only if he marked the article or provided actual notice; if the article does not teach the invention, then the patent owner could recover damages from the beginning of the infringement. *See id.* at 341-42. Voelzke argues that the additional costs incurred in determining whether an article teaches the invention would be less than the strategic costs incurred under the current rule. *See id.* at 343.

We agree that the goal of reducing these strategic costs is desirable. Thus, if a product does teach the process by which it was created, there may be merit to a rule that appropriately marking the product constitutes constructive notice of the process. As the text above suggests, however, we are less sanguine about Voelzke's proposal to the extent that it would impose strict liability damages upon an "innocent" infringer of a patented process, when the articles made publicly available do not teach the process. In such a case, it might be more sensible to go in the opposite direction and require actual notice, or at least actual knowledge, as a precondition to damages liability for the process claim. On the other hand, to the extent that this latter rule would make it easier to recover damages for the infringement of product claims, it might create an incentive (directly opposite to that which exists today) to draft and litigate a proliferation of product claims.

An alternative rule that would unite the standard for product and process patents would be for marking to constitute effective constructive notice in cases in which the article teaches the invention—whether it be a product or a process—and for actual notice or actual knowledge to be a precondition to damages liability when the article does not teach the invention. Indeed, in some cases this might provide a more "unitary" standard than Voelzke's proposal. For example, suppose that an unmarked article teaches the product but not the process claim of a given patent. Under Voelzke's proposal, as we understand it, the patent owner could recover pre-notice damages for infringement of the process, whereas under the alternative rule just described he could not recover pre-notice damages for the infringement of either claim. On the other hand, if the article is marked and it teaches the product but not the process, under Voelzke's proposal the patent owner could recover pre-actual notice damages for the infringement of both claims, whereas under the alternative rule he could recover these damages only for the product claim. We leave it to the interested reader to work out the remaining permutations.

114. *See supra* note 94 (discussing this problem).

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reason in this particular fact setting to condition the patent owner's damages on his having complied with a pointless formality.¹¹⁵ In addition, two other, more sweeping reforms may be worth considering, although these are likely to be more costly and, hence, controversial: the adoption of uniform federal regulations on marking, and, in lieu of a marking requirement, the adoption of a federal registry for commercialized inventions.

In theory, the adoption of uniform regulations, dictating in advance where to mark a product, how large the marking must be, and so on, would not be difficult to achieve. The main problems would be the familiar ones: that regulators may not foresee all possible situations and may therefore opt for a standard that is suboptimal, or that the regulatory process may become subject to industry capture. These possibilities, however, must be evaluated in light of the uncertainty that currently exists regarding compliance with the statute in many other cases. Federal regulations on copyright notice placement would be the obvious model to draw upon,¹¹⁶ and may not be difficult to modify for use in the present setting. At the

115. Alternatively, the rule could be that in a case of this nature the defendant is not liable for damages for conduct occurring prior to the receipt of actual notice or actual knowledge. The point is that requiring the patent owner to mark as a precondition to recovering damages is, in this instance, absurd.

116. Although the Copyright Act does not require the inclusion of copyright notice on works published on or after March 1, 1989, *see* 17 U.S.C. §§ 401(a), 402(a), 405(a), it offers some benefits to authors who include the notice on published copies of their works. *See* 17 U.S.C. § 401(d) (1994) (stating that the inclusion of copyright notice on published copies to which the defendant had access defeats a defense of innocent infringement in mitigation of actual or statutory damages); *id.* § 402(d) (same rule, with respect to copyrighted sound recordings embodied in phonorecords). Moreover, the inclusion of notice on copies published prior to that date can still affect a work's copyright status. *See id.* § 405(a); *Estate of King v. CBS, Inc.*, 194 F.3d 1211, 1214-16 (11th Cir. 1999). Federal regulations set forth some detailed rules for the placement of copyright notice. *See* 17 U.S.C. § 401(c) (1994) (stating that "notice shall be affixed to the copies in such manner and location as to give reasonable notice of the claim of copyright," and authorizing the Register of Copyright to prescribe by regulation, as examples, a nonexhaustive list of "specific methods of affixation and position so the notice on various types of works that will satisfy this requirement"); *id.* § 402(c) (stating that, with respect to copyrighted sound recordings embodied in phonorecords, "notice shall be placed on the surface of the phonorecord, or on the phonorecord label or container, in such manner and location as to give reasonable notice of the claim of copyright"); 37 C.F.R. § 201.20 (setting forth various examples of adequate notice, pursuant to § 401(c)); *id.* § 202.2 (listing "common defects" in copyright notice, including "a notice is permanently covered so that it cannot be seen without tearing the work apart;" "a notice is illegible or so small that it cannot be read without the aid of a magnifying glass;" "a notice is on a detachable tag and will eventually be detached and discarded when the work is put in use;" and "a notice is on the wrapper or container which is not a part of the work and which will eventually be removed and discarded when the work is put in use").

very least, it would be helpful to know, for example, whether, in our television component hypothetical,¹¹⁷ the patent notice must be placed on the final product or only on the interior component, in order to be effective.

A more radical proposal would be to create a registry for commercialized patented inventions and to provide that registration, rather than marking, constitutes constructive notice for purposes of assessing damages against infringing manufacturers. This proposal is designed to avoid the problem of technical compliance with the marking statute that nevertheless fails to convey actual notice to potential infringers. Suppose, for example, that the patent owner who wishes to register his invention must provide evidence of his actual use of the invention in products or processes. Theoretically, this type of system might provide more effective notice than marking, in cases in which the patent owner markets only a small number of products that might otherwise evade a potential infringer's attention. Moreover, since only a portion of all patents ever result in commercial products,¹¹⁸ the burden upon manufacturers to check the registry may well be manageable—certainly more manageable than trying to monitor all existing patents would be under the current system. (Registration also would allow someone to use patents that are not listed on the registry without having to worry about incurring damages liability, unless and until the receipt of actual notice; and perhaps this sort of “efficient” infringement should be encouraged.) Balanced against these benefits, however, would be the cost of maintaining the registry. These would include not only the costs of setting up and maintaining the system, but also of monitoring its operation so as to preclude patentees from registering

117. See *supra* note 73.

118. One study from the 1950s concluded that approximately sixty percent of all patented inventions result in some commercial uses, contradicting earlier estimates that were much lower. See Joseph Rossman & Barkev S. Sanders, *The Patent Utility Study*, in NURTURING NEW IDEAS: LEGAL RIGHTS AND ECONOMIC ROLES 106, 130 & n.29 (L. James Harris ed. 1969) (cited in Brent Rabowsky, Note, *Recovery of Lost Profits on Unpatented Products in Patent Infringement Cases*, 70 S. CAL. L. REV. 281, 282-83 (1996)). We doubt that more recent studies would disclose a percentage anywhere near 50%. See generally Lemley, *supra* note 82, at 1501, 1503, 1507 n.53, 1514 (stating that “[t]he limited data . . . suggest that the overwhelming majority of patents are neither litigated nor licensed,” noting that about two-thirds of patents are allowed to lapse before their expiration date, and speculating that the percentage of commercially valuable patents is quite low). Although the latter paper does not disprove Barkev and Sanders—it studies different things—the evidence presented therein seems to us inconsistent with what one would expect if the Barkev-Sanders data were correct. We are not aware, however, of any research that expressly confirms or disproves the Barkev and Sanders study.

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merely token uses.¹¹⁹ On balance, it seems doubtful that the problem merits such a costly solution.

V. CONCLUSION

We have argued that patent infringement is not a strict liability tort after all, if one considers the effect of section 287 upon the patent owner's ability to recover compensatory damages—and that maybe this is a good thing, inasmuch as it gives the patent owner an incentive to put potential infringers on notice. The way the statute operates nevertheless leaves much to be desired, in that it is both overinclusive (sometimes “innocent” infringers *are* strictly liable) and underinclusive (sometimes requiring the provision of notice to knowing infringers). We have suggested some modest reforms to cure the latter problem. We have also suggested some less modest reforms that would address the former problem, but the cost-effectiveness of these solutions is less certain.

We have also considered various alternatives to the present regime of modified strict liability, including a regime under which independent discovery is a defense; a negligence regime; and a comparative negligence regime. Although there is a good theoretical case for the first of these regimes, we are skeptical about its practical applicability. The latter two regimes suffer from much the same problem, in that courts (and juries) are likely to be imperfect assessors of the socially optimal amount of search or notice.

119. As noted above, under the current system marketing and marking a few token items would appear to suffice under section 287. We view this as a drawback of the current system. If, however, the registry is open only to patent owners who are willing to verify a certain amount of commercialization, akin to (but perhaps more substantial than?) the amount of use that is necessary for establishing federal trademark rights, the administrative cost of this system may well outweigh any potential benefits, as discussed above.