

# Experimental Use as Patent Infringement: The Impropriety of a Broad Exception

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The federal patent laws grant to every “patentee, his heirs or assigns, for the term of seventeen years . . . the right to exclude others from making, using, or selling the [patented] invention throughout the United States . . . .”<sup>1</sup> The law goes on to define an infringer as anyone who “without authority makes, uses, or sells any patented invention, within the United States during the term of the patent . . . .”<sup>2</sup> The statutory language seems to be unequivocal: a patentee has an unqualified right to exclude others from “making, using, or selling” the patented invention, and if anyone is found to have made, used, or sold the patented invention, he or she is liable to the patentee, as an infringer, for damages not “less than a reasonable royalty.”<sup>3</sup>

The purpose of this Note is to examine the scope of a judicially created exception to the normal infringement rule, commonly known as the “experimental use” exception. The exception allows for the unlicensed construction and use of a patented invention under certain circumstances.<sup>4</sup> Recently, some legal practitioners and scholars have presented arguments favoring broad application of the exception to attempts by innovators both to “design-around” and improve upon existing patents.<sup>5</sup> Moreover, a group of Representatives has expressed an interest in codifying this expansive view of the exception as evidenced by

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1. 35 U.S.C. § 154 (1988).

2. 35 U.S.C. § 271(a) (1988).

3. 35 U.S.C. § 284 (1988).

4. This exception was created by Justice Story in *Whittemore v. Cutter*, 29 F. Cas. 1120 (C.C.D. Mass. 1813) (No. 17,600). See *infra* notes 8-13 and accompanying text.

5. Israelsen, *Making, Using, Selling Without Infringing: An Examination of 35 U.S.C. Section 271(e) and the Experimental Use Exception to Patent Infringement*, 16 AM. INTELL. PROP. L.A.Q.J. 457, 475 (1989), presents a framework for the expanded application of the experimental use exception (emphasis added):

[T]he goals of the patent system are furthered by permitting at least the following activities, regardless of commercial motivation and the ultimate financial impact on the patentee . . . (c) development and patenting, but not commercialization, of improvement inventions; and (d) designing around patented inventions.

Israelsen's call for an expansive application is voiced by all of the recent commentators on the subject. See Chisum, *The Patentability of Algorithms*, 47 U. PITT. L. REV. 959, 1017-19 (1986); Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177, 218-25 (1987); Hantman, *Experimental Use as an Exception to Patent Infringement*, 67 J. PAT. & TRADEMARK OFF. SOC'Y 617 (1985); Merges, *Intellectual Property in Higher Life Forms: The Patent System and Controversial Technologies*, 47 MD. L. REV. 1051, 1073-74 (1988).

introduction of the Research, Experimentation, and Competitiveness Act of 1990<sup>6</sup> in the House. In contrast to these recent attempts to broaden the exception, this Note evaluates the breadth of the exception and suggests that it should be applied as it has been in the past: in a very restrictive manner, consistent with the purpose and function of the patent system.

Although the judicial history of the exception is, at best, indeterminate on the question of its precise scope, the courts generally have applied the exception restrictively. Policy arguments that have been put forth to justify expansive application of the exception to design-around and improvement attempts are deficient. Because they are premised on an inaccurate assessment of the objectives of the patent system, these arguments fail to consider the general incentives that innovators have to share the fruits of their discoveries with one another.

Given the complexity and the subtleties of the innovation process,<sup>7</sup> it is unwise to empower the federal courts indiscriminately to apply a broad experimental use exception. Part I of this Note will present a history of the exception in order to delineate its contours. Part II will examine the policy justifications that counsel against an expansive application and will explore the incentives innovators have to share their discoveries with one another. Part III will conclude by suggesting that an expansive experimental use exception is unwarranted and that the recent concerns prompting the call for a broad exception can be better addressed through focused congressional inquiries directed toward industry-specific solutions.

## I. HISTORY OF THE EXPERIMENTAL USE EXCEPTION

The right to exclude, as announced in the federal patent laws, is not absolute. Courts have occasionally recognized the experimental use exception as a defense to a charge of infringement.

### A. Justice Story's Analysis

In the 1813 decision of *Whittemore v. Cutter*,<sup>8</sup> Justice Story, sitting on the Federal Circuit Court of Massachusetts in an appellate capacity, created the experimental use exception. In this case, the defendant appealed a jury instruc-

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6. H.R. 5598, 101st Cong., 1st Sess. §§ 401-03 (1990). See *infra* notes 38-39 and accompanying text.

7. At the outset, it is crucial to note a distinction between two terms that are used frequently throughout this Note; they are "invention" and "innovation." As one author put it:

An *invention* refers to the practical implementation of the inventor's idea. . . . [It] is more than a concept (it is usually a tangible thing), but less than the fully worked out product or process first offered for sale to customers. An *innovation* is the "debugged" and functional version of the invention: the version first offered for sale.

Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CAL. L. REV. 805, 807 (1988) (footnote omitted; emphasis in original).

8. 29 F. Cas. 1120 (C.C.D. Mass. 1813) (No. 17,600).

tion, which stated in part that the “making of a machine . . . with a design to use it for profit” constituted infringement.<sup>9</sup> Justice Story upheld the trial judge’s instruction regarding the nature of infringement, and indicated further that the “use for profit” requirement actually favored the defendant because

it could never have been the intention of the legislature to punish a man, who constructed such a machine *merely for philosophical experiments, or for the purpose of ascertaining the sufficiency of the machine to produce its described effects.*<sup>10</sup>

Later that same year, Justice Story elaborated on this exception to infringement in *Sawin v. Guild*.<sup>11</sup> In this case, a patentee brought an infringement action against a deputy sheriff for seizing and selling three patented nail cutting machines to satisfy a judgment debt of the plaintiff/patentee. In holding that the deputy’s actions did not constitute infringement, Justice Story, in dicta, remarked:

[T]he making of a patented machine to be an offense . . . *must be the making with an intent to use for profit, and not for the mere purpose of philosophical experiments, or to ascertain the verity and exactness of the specification . . .*<sup>12</sup>

Thus, Justice Story viewed this exception to infringement as having two components: (1) the activity must not be performed with the intent to gain profit and (2) the activity must be either (a) for philosophical experiments or (b) for ascertaining the verity and exactness of the specification.<sup>13</sup>

Justice Story’s formulation of the exception has been the subject of some academic debate. Commentators present a range of views both as to what Justice Story meant to accomplish by the creation of the experimental use exception and as to the appropriate application of the exception.<sup>14</sup> These

9. *Id.* at 1121.

10. *Id.* (emphasis added).

11. 21 F. Cas. 554 (C.C.D. Mass. 1813) (No. 12,391).

12. *Id.* at 555 (emphasis added).

13. Hantman, *supra* note 5, at 620, suggests this interpretation of Justice Story’s formulation.

14. Richard Bee has written:

The only explanation for the experimental use exception which seems to make any sense is that Justice Story, after a brief reflection on the matter, simply felt that the plain language of the statute [the Patent Act of 1793] could not have really been intended to cover the case of a man sitting at home in his parlor or basement workshop and tinkering around with a piece of apparatus as a “philosophical experiment” and, hence, that this case should be simply an exception to the rights granted the patentee.

Bee, *Experimental Use as an Act of Patent Infringement*, 39 J. PAT. OFF. SOC’Y 357, 367 (1957). Donald Chisum has indicated that the phrase “philosophical inquiry” probably had a different meaning when Justice Story created the experimental use exception than it carries today. In his view, philosophical inquiry was likely to have meant research directed at developing new technologies. Chisum, *supra* note 5, at 1019 n.203. Chisum does not elaborate on this, and we are left to wonder from what sources he draws such a conclusion. Rebecca Eisenberg has interpreted Justice Story’s “philosophical experiments” differently, writing, “[t]he first prong of Justice Story’s experimental use privilege, permitting ‘philosophical experiments,’ is not well

commentators rely on case law and policy analysis to make their arguments. Critical evaluation of these arguments reveals that case law is indeterminate on the question of the appropriate application of the exception. In addition, the policy justifications proffered are simplistic, failing to consider the incentives parties have to innovate and share their discoveries with one another. To this point, scholarship considering the experimental use exception provides little valuable guidance as to its appropriate application.

### B. Case Law Construing the Exception

Analysis of the case law construing Justice Story's formulation reveals a history of restrictive application of the experimental use exception by the courts. Many of the cases present a common scenario in which an alleged infringer uses the patented invention to test the potential applicability of the invention to his business. In these cases, courts have sustained the defense of experimental use to charges of infringement only when the alleged infringer realized *no economic gain* from the experimental activity.<sup>15</sup> When the experimenter has profited in some manner by his experimental use, the courts have found infringement.<sup>16</sup>

When they have allowed the experimental use defense, courts have inadequately detailed their reasons for upholding the defense. While case law is unclear as to when courts should apply the exception, it is apparent that courts have rarely sustained the pleas for experimental use.<sup>17</sup> Courts rely on phrases like "experimental activity" and lack of "direct economic gain" to justify their allowances of the exception but have not defined these phrases with any particularity. The case law simply is ambiguous as to what conditions are necessary for allowance of experimental use as a defense. *Chesterfield v. United*

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defined in the cases, but it seems to permit subsequent researchers to use the patented invention at least in traditional basic research with no commercial implications." Eisenberg, *supra* note 5, at 224.

15. See, e.g., *Le Clair v. Shell Oil Co.*, 183 F. Supp. 255 (S.D. Ill. 1960) (defendant's limited use of "data logger" to determine whether device could be applied to defendant's business found to be non-infringing); *Akro Agate Co. v. Master Marble Co.*, 18 F. Supp. 305, 333 (N.D.W. Va. 1937) ("experimental testing by defendant [of the patented invention] for a brief period before going into commercial production . . . was not in law an act of infringement as marbles were not commercially sold.")

16. See, e.g., *Spray Refrigeration Co. v. Sea Spray Fishing, Inc.*, 322 F.2d 34 (9th Cir. 1963); *Clerk v. Tannage Patent Co.*, 84 F. 643 (3d Cir. 1898); *Imperial Chem. Indus., PLC v. Henkel Corp.*, 545 F. Supp. 635 (D. Del. 1982); *Northill, Co. v. Danforth*, 51 F. Supp. 928 (N.D. Cal. 1942); *Radio Corp. of Am. v. Andrea*, 15 F. Supp. 685 (E.D.N.Y. 1936); *Pairpearl Prod., Inc. v. Joseph H. Meyer Bros.*, 58 F.2d 802 (D. Me. 1932); *National Meter Co. v. Thomson Meter Co.*, 106 F. 531 (C.C.S.D.N.Y. 1900); *United States Mitis Co. v. Carnegie Steel Co.*, 89 F. 343 (C.C.W.D. Pa. 1898), *aff'd without opinion*, 90 F. 829 (3d Cir. 1898); *Cimiotti Unhairing Co. v. Derboklow*, 87 F. 997 (C.C.E.D.N.Y. 1898); *Poppenhusen v. Falke*, 19 F. Cas. 1048 (C.C.S.D.N.Y. 1861) (No. 11,279); *Poppenhusen v. New York Gutta Percha Comb Co.*, 19 F. Cas. 1059 (C.C.S.D.N.Y. 1858) (No. 11,283).

17. See cases cited *supra* note 16.

*States*<sup>18</sup> and *Finney v. United States*,<sup>19</sup> two experimental use cases involving the government, are illustrative of the deficient analysis applied by the courts.

In *Chesterfield*, the plaintiff claimed that the defendant's use of several cobalt-nickel alloys infringed two of its patents. After ruling that both patents were invalid,<sup>20</sup> the Court of Claims unnecessarily addressed the infringement issue. Concluding that none of the government's activity would have constituted infringement had the patents been valid, the court remarked: "the evidence shows that a portion of the . . . alloy procured by the defendant was used only for testing and for experimental purposes, and there is no evidence that the remainder was used other than experimentally."<sup>21</sup> Unfortunately, the court goes no further to identify the experimental activity or to specify which of those activities qualified as experimental.

In *Finney*, the court took a different approach to experimental use, which again fails to clarify the ambiguity surrounding this defense. In this case, NASA used a patented velcro glove once during a training experiment for the Apollo XIV mission. The court concluded that "the doctrine of de minimis non curat lex [the law is not concerned with trifles] applies."<sup>22</sup> On the basis of this de minimis notion, several other courts have either declined to find infringement or have failed to order an injunction or to award damages.<sup>23</sup>

In sum, the relevant case law reveals that courts have narrowly construed the experimental use exception. When they have allowed the exception, courts have provided little insight into their reasons and have been conclusory in their justifications for allowing the experimental use defense.<sup>24</sup> A de minimis rationale underlies the reasoning of some of the decisions in which the courts have upheld the defense,<sup>25</sup> while the particular facts of the case may explain other decisions.<sup>26</sup> In addition, courts have been very wary of allowing the experimental use exception when the experimenting party has had a "business pur-

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18. 159 F. Supp. 371 (Ct. Cl. 1958).

19. 188 U.S.P.Q. 33 (Ct. Cl. Trial Div. 1975).

20. For a discussion of the necessary elements for patent validity, see *infra* note 63.

21. 159 F. Supp. at 375.

22. 188 U.S.P.Q. at 35.

23. See, e.g., *Maxon Premix Burner Co. v. Eclipse Fuel Eng'g Co.*, 471 F.2d 308 (7th Cir. 1972), *cert. denied*, 410 U.S. 929 (1973); *Condenser Corp. of Am. v. Micamold Radio Corp.*, 145 F.2d 878 (2d Cir. 1944); *Morpul, Inc. v. Crescent Hosiery Mills*, 265 F. Supp. 279 (E.D. Tenn. 1967). See also *Albright v. Celluloid Harness-Trimming Co.*, 1 F. Cas. 320, 323 (C.C.D.N.J. 1877) (No. 147) (finding infringement and enjoining further infringing activity, but declining to award compensation "as no damage or profits have been shown or suggested").

24. See, e.g., *Chesterfield v. United States*, 159 F. Supp. 371 (Ct. Cl. 1958); *Finney v. United States*, 188 U.S.P.Q. (BNA) 33 (Trial Div., Ct. Cl. 1975).

25. See cases cited *supra* note 23.

26. See, e.g., *Kaz Mfg. v. Chesebrough-Ponds, Inc.*, 211 F. Supp. 815 (S.D.N.Y. 1962), *aff'd*, 317 F.2d 679 (2d Cir. 1963) (refusing to find infringement, even though defendant had used hybrid combination of plaintiff's patented vaporizers in television commercial, because defendant legitimately purchased vaporizers on open market).

pose" or has benefited commercially from the unlicensed use of the patented invention.<sup>27</sup>

### C. Legislation and Its Effects Upon the Experimental Use Exception

Prior to 1984, only the courts had addressed the issue of the scope of the experimental use exception. The passage of the Drug Price Competition and Patent Term Restoration Act of 1984 (Restoration Act)<sup>28</sup> marked the first congressional effort to except certain experimental activities from the purview of the patent infringement provisions. The Restoration Act, which creates an exception to the normal infringement rule for parties applying for FDA approval for generic medical equivalents before the end of the patent term, effectively nullified the decision of the Court of Appeals for the Federal Circuit<sup>29</sup> in *Roche Products, Inc. v. Bolar Pharmaceutical Co.*<sup>30</sup>

In *Roche*, the Federal Circuit considered the experimental use defense for the first time. Here, the defendant, Bolar, wished to market a generic version of a patented drug. Because FDA approval of a drug for marketing "can take more than two years," Bolar procured a quantity of the drug from a foreign manufacturer and "immediately began its effort to obtain federal approval to market its generic version of [the patented drug]."<sup>31</sup> The Federal Circuit overruled the district court's finding of non-infringement,<sup>32</sup> determining that the experimental use exception did not apply in this case. The Federal Circuit held that the exception did not reach "the limited use of a patented drug for testing and investigation strictly related to FDA drug approval requirements during the last 6 months of the term of the patent . . . ."<sup>33</sup> As part of its reasoning, the Federal Circuit remarked:

Bolar's intended "experimental" use is solely for business reasons and not for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry. . . . Bolar may intend to perform "experiments," but unlicensed experiments conducted with a view to the adaption of the patented

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27. *E.g.*, *Spray Refrigeration Co. v. Sea Spray Fishing, Inc.*, 322 F.2d 34 (9th Cir. 1963) (defendant's use of plaintiff's patented method for freezing fish constituted infringement when process was used during commercial fishing voyages); *Clerk v. Tannage Patent Co.*, 84 F. 643 (3d Cir. 1898) (defendant's use of patented process for tanning hides and skins for nine months constituted infringement); *Cimiotti Unhairing Co. v. Derboklow*, 87 F. 997 (C.C.E.D.N.Y. 1898) (defendant's use of two patented pelt-dehairing machines for nearly three years found to be infringing); *see supra* notes 15-16 and accompanying text.

28. Pub. L. No. 98-417, § 202, 98 Stat. 1585, 1603 (1984) (codified at 35 U.S.C. § 271(e) (1988)).

29. The Federal Circuit, which has jurisdiction over all appeals in cases "arising under" the federal patent laws, was established in 1982 by the Federal Courts Improvement Act of 1982, 28 U.S.C. § 1295 (1982).

30. 733 F.2d 858 (Fed. Cir. 1984).

31. *Id.* at 860.

32. *Roche Products, Inc. v. Bolar Pharmaceutical Co.*, 572 F. Supp. 255 (E.D.N.Y. 1983), *rev'd*, 733 F.2d 858 (Fed. Cir. 1984).

33. 733 F.2d at 861.

invention to the experimenter's business is a violation of the rights of the patentee to exclude others from using his patented invention.<sup>34</sup>

In a later case, *Eli Lilly & Co. v. Medtronic, Inc.*, the Federal Circuit explicitly recognized that Congress had legislatively overturned *Roche*.<sup>35</sup> In this case, Lilly sued Medtronic for infringement of claims, which Lilly alleged covered certain implantable cardioverter defibrillators. Medtronic countered by claiming that its development of such devices before the end of the patent term fell within the exception created by the Restoration Act. In ruling that the development of medical devices did fall within the authority the Restoration Act, the court commented:

[I]t simply makes no sense to apply *Roche* as precedent to nondrug products when the case has no precedential value as to the specific products of the *Roche* suit . . . . We can only conclude that Congress intended the enactment of section 271(e)(1) [which codifies the Restoration Act] to set aside the *Roche* interpretation of section 271(a) [defining infringement] in *all* of its ramifications.<sup>36</sup>

Despite this later disclaimer by the Federal Circuit, it is important to note that in the absence of an explicit legislative mandate, the Federal Circuit presented restrictive dicta in *Roche* concerning the experimental use exception. Thus, the *Roche* decision and reasoning can be read to reflect the Federal Circuit's general view that the exception should be narrowly construed.<sup>37</sup> To date, no court has had the opportunity to rule on an experimental use case in light of the Federal Circuit's repudiation of its *Roche* ruling.

Recently proposed legislation, the Research, Experimentation, and Competitiveness Act of 1990 (Competitiveness Act),<sup>38</sup> also suggests that it would be inappropriate to interpret the decisions of prior courts as giving a broad reading to the exception. This bill codifies an expansive view of the exception,<sup>39</sup> which the Note will critique below. For the current analysis, however, the section of the bill entitled "Applicability of Prior Substantive Law" supports the Note's

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34. *Id.* at 863.

35. 10 U.S.P.Q.2d (BNA) 1304 (Fed. Cir. 1989), *aff'd*, 110 S. Ct. 2683 (1990).

36. 10 U.S.P.Q.2d at 1307 (emphasis added).

37. This interpretation is supported by the Federal Circuit's holding in the *Scripps* case, discussed below. In this case, decided after passage of the Restoration Act but before *Medtronic*, the court refused to find experimental use despite the defendant's claim that its experimental activities were solely directed at gaining FDA approval for its drug. *See infra* notes 101-02 and accompanying text. *See also* *Eli Lilly & Co. v. A.H. Robbins Co.*, 228 U.S.P.Q. (BNA) 757, 760 (E.D. Va. 1985) (ruling that "[w]hile the evidence is devoid of any commercial use of the [patented] product [in suit], it cannot be doubted that Robins' use was solely for business reasons.").

38. H.R. 5598, 101st Cong., 1st Sess. §§ 401-403 (1990).

39. The bill states, in pertinent part, "It shall not be an act of infringement to make or use a patented invention solely for research or experimentation purposes . . ." H.R. 5598, 101st Cong., 1st Sess. § 402 (1990). It should be noted that nowhere in the bill do the drafters define the phrase "solely for . . . experimental purposes."

contention that prior experimental use case law does not support an expanded application of the defense.<sup>40</sup>

The relevant section provides: "The substantive law in effect before the date of the enactment of this Act shall apply to cases arising from research or experimentation conducted before such date of enactment."<sup>41</sup> Such a provision by itself does not definitively prove that the prior case law does not encompass an expanded experimental use application. But when viewed in conjunction with the substantive directive of the bill,<sup>42</sup> this provision illustrates that the drafters recognized that the bill *expands the scope* of the previously existing law. Moreover, the fact that the drafters did not advocate retroactive application of the bill is indicative of their attempt to preserve the rights of those patentees who acquired patents prior to the bill's consideration. After all, if the purpose of the Competitiveness Act were solely to *clarify* the scope of the experimental use exception (i.e., not change the substantive law in any way), there would be no reason not to allow for retroactive application.

## II. THE FALLACIES OF EXPANDED APPLICATION

### A. A Critique of Arguments Advocating Expansion

Given the narrow contours of the case law, some commentators have argued for a more expansive interpretation of the exception, which would allow innovators to design around and improve upon existing patents. They maintain that a broad experimental use exception is needed to sustain an acceptable level of innovative activity.<sup>43</sup> By and large, their arguments fail to consider the disincentive effects a broad exception would have on innovation in those industries that rely heavily on patent protection.<sup>44</sup>

Eisenberg has noted that the patent law's requirement of an early enabling disclosure (i.e., that the disclosure describe the invention with sufficient clarity to permit one familiar with the relevant technology to build the invention)<sup>45</sup> contemplates that "certain uses of patented inventions during the patent term

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40. See *Transgenic Animal Patent Reform Act of 1989: Hearings on H.R. 1556 Before the Subcomm. on Courts, Intellectual Property, and the Administration of Justice of the House Comm. on the Judiciary*, 101st Cong., 1st Sess. 464-66 (1989) [hereinafter *Hearings*] (acknowledging ambiguity in experimental use case law). H.R. 1556 was the predecessor bill to H.R. 5598.

41. H.R. 5598, 101st Cong., 1st Sess. § 403(b) (1990).

42. See *supra* note 39.

43. See *supra* note 5.

44. See, e.g., 1988 A.B.A. SEC. PAT., TRADEMARK & COPYRIGHT L. REP. 25-28 (failing to mention disincentive effects of broad experimental use).

45. 35 U.S.C. § 112 (1988) states (emphasis added):

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to *enable any person skilled in the art* to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the *best mode* contemplated by the inventor of carrying out his invention.

do not constitute patent infringement.”<sup>46</sup> She reasons that “[i]f the public had absolutely no right to make, use, or sell the patented invention until the *end* of the patent term, it would be somewhat puzzling to require that the patentee give the public an enabling disclosure of the invention at the *beginning* of the patent term.”<sup>47</sup>

Eisenberg’s assertion that an early disclosure policy anticipates some uses of the patented invention is understandable; some uses of the patented invention do follow from the disclosure. For example, ascertaining the verity and exactness of the specification, which falls under Justice Story’s formulation, may be one use arising from early disclosure. An enabling disclosure encourages private parties to test the invention to determine whether it really does what is claimed (that is, to check for verity). This private policing activity protects against awarding invalid patents. In addition, by providing a technical description of a patented invention, enabling disclosures reduce the likelihood that others will wastefully duplicate the research efforts of the patentee and inform the public of the breadth of the patent protection—crucial information if other inventors are to avoid infringing the patent. And, as noted by Eisenberg, those descriptions contained in the disclosures give “the public access to those parts of the specification that the patentee does not claim.”<sup>48</sup>

Although enabling disclosure requirements contemplate that some unlicensed uses of patented inventions are acceptable, it is unjustified and inconsistent with patent law to assume that these uses include experimental activity involving the use and construction of a patented invention in a commercial attempt to develop either a non-infringing alternative (design-around) or an improvement upon an existing patent. Section 284 of the Patent Code guarantees to a successful claimant “damages adequate to compensate for the use made of the invention by the infringement *but in no event less than a reasonable royalty*,”<sup>49</sup> thus assuring a patentee of compensation even without a showing of actual pecuniary loss. This provision evinces a policy of requiring all parties that use a patented idea to pay the patentee for the privilege. According to this view, only those uses that are totally beyond the range of commercial expectation should qualify as non-infringing.<sup>50</sup> As opposed to the acceptable uses that derive from early disclosure, design-around attempts and improvement endeavors are not completely beyond the range of commercial expectation; the infringer, through her utilization of the patentee’s protected idea, engages in experimental activities with an eye towards future profit.

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46. Eisenberg, *supra* note 5, at 219.

47. *Id.* (emphasis original).

48. *Id.*

49. Emphasis added.

50. *See* Kaz Mfg. Co. v. Chesebrough-Ponds, Inc., 317 F.2d 679, 680-81 n.3 (2d Cir. 1963) (“[O]ne who constructs a patented wall safe but uses it only as an anchor for his boat would not be a patent infringer since such a use would not be for the purpose of utilizing the teachings of the patent.”).

Israelsen has recently addressed the subject of experimental use and has proposed a new framework within which to assess potentially infringing activity.<sup>51</sup> This commentator suggests that the courts should interpret section 271(a), which defines infringement,<sup>52</sup> in much the same way as they interpret the “public use” and “on sale” bars of section 102(b).<sup>53</sup> Israelsen’s suggested framework is a novel one. Unfortunately, he fails to acknowledge key policy differences behind section 102 and section 271(a)—differences that preclude similar application of these two “experimental use” doctrines.

Section 102, by limiting the uses that can be made of an invention before the filing of a patent application, encourages early public disclosure, which, in turn, enhances the public interest by promoting the marketing of a steady stream of innovations.<sup>54</sup> Underlying the early disclosure rationale is the oft-cited presumption that the quid pro quo for receiving a patent is that the inventor must disclose her invention to the public.<sup>55</sup> When interpreting section 102, courts have ruled that a public use that primarily has an experimental purpose does not create a section 102(b) bar to patentability.<sup>56</sup> Thus, the courts have allowed prospective patentees to experiment publicly with their inventions before applying for patent protection. Such experimentation may be necessary for an inventor to describe fully the characteristics of his invention, which, in turn, facilitates the disclosure of the *best mode* of use for the invention, a disclosure the patent laws require.<sup>57</sup> Public experimentation helps to maximize public disclosure of patented inventions, and the courts have accordingly utilized less rigorous standards for a successful showing of experimental use in the section 102 context.

The underlying rationale for section 271(a) can be contrasted to demonstrate the problem with Israelsen’s suggestion. Section 271(a) ensures to an inventor compensation for the unlicensed use, construction, or sale of her invention by others. When a court issues an opinion on experimental use related to this

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51. See Israelsen, *supra* note 5, at 475-78.

52. See *supra* note 2 and accompanying text.

53. This section states, in pertinent part, that an inventor is not entitled to a patent if “the invention was . . . in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.” 35 U.S.C. § 102 (1988).

54. See *Mercoird Corp. v. Mid-Continent Co.*, 320 U.S. 661, 665 (1944) (public interest is dominant in patent system); *State Industries v. A.O. Smith Corp.*, 751 F.2d 1226, 1234-35 (Fed. Cir. 1985) (function of patent system is to “bring[] a steady flow of innovations to the market.”); *Chicago Steel Foundry Co. v. Burnside Steel Foundry Co.*, 132 F.2d 812, 816 (7th Cir. 1943) (“The issuance of patents is . . . to encourage discoveries which will benefit the people.”) (emphasis added); see also F.M. SCHERER, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 440 (2d ed. 1980) (listing main reasons for granting exclusive patent rights: “to promote invention, to encourage the development and commercial utilization of inventions, and to encourage inventors to disclose their inventions to the public.”) (emphasis added).

55. See Eisenberg, *supra* note 5, at 219; see also, Noonan, *Understanding Patent Scope*, 65 OR. L. REV. 717, 722 (1986) (“A patent can be viewed as a contract between the public and the inventor in which the inventor agrees to disclose his advances to the public in return for the right to exclusively use that advance for seventeen years.”) (footnote omitted).

56. See, e.g., *Elizabeth v. Pavement Co.*, 97 U.S. 126 (1877) (ruling that public, experimental testing of new road pavement did not constitute public use).

57. See *supra* note 45.

section, an issued patent already exists. A patentee presumably has disclosed early and in a way that enables one skilled in the art to build the invention claimed.<sup>58</sup> Hence, the courts' role is to determine whether to allow *others* to engage in the unlicensed use of the patentee's protected idea. In doing so, the courts must decide whether the experimental use by others will discourage future inventors from utilizing patent protection (because of the potential for competitors to experiment on the invention disclosed in the patent). The courts must determine whether such use either is of so innocuous a character as not to warrant injunctive relief and/or damages<sup>59</sup> or so overwhelmingly furthers countervailing goals as to be permitted.<sup>60</sup> In making this determination, the courts must recognize that any use to which a patentee has not voluntarily consented will dissuade future inventors from utilizing the patent system to protect their ideas.

When the courts are called upon to evaluate experimental use in the context of section 102, in contrast, they must necessarily conceptualize the issue differently. Here the experimentation is conducted by the inventor himself in an attempt to understand fully the scope of her invention. Thus, such experimentation does not implicate the potential disincentive effects that accompany experimentation in the section 271(a) context. Hence, a less restrictive experimental use allowance in this context works to the advantage of both the inventor and the public by enabling the inventor to make the most complete disclosure possible and thus claim the broadest protection in the patent application.

#### B. *Distinguishing Between Acceptable and Unacceptable Experimental Use*

Allowing parties to construct and use a patented invention in an effort to see whether it does what is claimed is consistent with patent law. First, this type of use falls within the second prong of Justice Story's formulation, specifically, to ascertain the verity and exactness of the specification. Second, such a use helps to ensure that the patent disclosure describes the invention in the terms required by section 112, which directs that the specification be tailored to those familiar with the relevant art. Last, this type of use encourages potential competitors to police their rivals, thereby reducing the number of invalid patents that are issued and the corresponding social costs.<sup>61</sup>

Related to this policing function is another acceptable use, that is "comparative testing against a patented invention to establish patentability of another

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58. *Id.*

59. See cases cited *supra* note 23.

60. See Comment, *Compulsory Patent Licensing in the United States: An Idea Whose Time Has Come*, 8 NW. J. INT'L L. & BUS. 666 (1988) (discussing some common countervailing justifications given for limiting patentee's right to exclude others, such as public health and national defense).

61. These costs include the R&D costs of others who expend resources in an attempt to invent around invalid patents and the litigation costs of challenging validity.

invention."<sup>62</sup> This use does not directly threaten the pecuniary interests of the patentee and serves the useful function of allowing a potential patentee to determine more readily whether prior art precludes his invention. This type of experimental use also increases the probability that patent applications will disclose *patentable*<sup>63</sup> inventions and thereby reduces the administrative costs attendant to Patent & Trademark Office review and rejection of patent applications. Use in this form also appears to fall within Justice Story's formulation.

Finally, it would appear that pure scientific research (i.e., that with no foreseeable commercial implications), involving experimentation on a patented invention to see how it works, also falls under Justice Story's formulation (i.e., philosophical experiments). Such noncommercial investigations of a patented invention, engaged in *solely* to satisfy scientific curiosity, do not threaten the potential gains that the patent grant safeguards for the patentee. At the same time, this type of experimental activity is advantageous because it fosters the quest to expand human knowledge.

Allowing parties seeking to develop commercially either useful improvements or substitute technologies, i.e., design-arounds, to experiment on patented inventions is not consistent with the policy of patent law. Commentators who advocate an expanded exception fail to recognize that expansion would severely limit the ability of the patent system, through its reward<sup>64</sup> and prospect<sup>65</sup> functions, to assure to a patentee the appropriability of returns on her investment of resources in research and development (R&D). As such, they fail to realize that a broad experimental use exception, by discouraging inventors from relying on the patent system, would decrease the level of public disclosure of new inventions as well as reduce innovative activity in those industries that rely on patent protection. A broad exception, rather than fostering innovation, would have exactly the opposite effect.

An unlicensed appropriation of a patentee's protected ideas weakens his control over his patented idea and deprives the patentee of some of the pecuniary benefits protected by his patent rights. These commentators also fail to value the contribution that the patentee may have made to the development of his competitors' innovations. After all, *but for* the patentee's inventive efforts *and* his willingness to disclose the fruits of those efforts, competitors would not even be in a position to develop a noninfringing alternative or improvement.

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62. Israelsen, *supra* note 5, at 475; see also *id.* at 473 & n.80.

63. To receive a patent, an applicant must demonstrate to the patent examiner that the invention claimed meets the three criteria for patentability: novelty, utility, and non-obviousness. 35 U.S.C. §§ 101-03 (1988). A successful showing of novelty demonstrates that the applicant was the first to make the invention. To meet the utility requirement, an applicant must demonstrate that the invention is useful in some way. The non-obviousness requirement ensures that an invention is more than a trivial advancement in the relevant art (i.e., that it was not obvious to one skilled in the pertinent art). For a basic introduction to the operation of the patent system, see P. AREEDA & L. KAPLOW, *ANTITRUST ANALYSIS: PROBLEMS, TEXT, CASES* ¶¶ 181-88 (1988).

64. See *infra* note 66 and accompanying text.

65. See *infra* note 69 and accompanying text.

Allowing competitors to reap benefits from a patentee's inventive efforts works against the reward theory of the patent system, which views the patent as a device that "enables the inventor to capture the returns from his investment in the invention, returns that would otherwise (absent secrecy) be subject to appropriation by others."<sup>66</sup> Under this theory, it is the expectation of the reward of the patent monopoly that encourages people to devote resources to inventive endeavors in the first place. An expansive experimental use exception, which threatens the patentee's potential for economic returns, would reduce inventive activity, particularly in those industries that rely heavily on patent protection.<sup>67</sup>

The patent system has also been identified as serving a prospect function, which complements its reward role.<sup>68</sup> While the system provides a reward by guaranteeing a return on capital for those resources *already* expended on R&D, it also serves a prospect function by encouraging investors to devote capital resources to R&D on projects that have a sound prospect of yielding commercial returns *in the future*. The prospect theory of the patent system "conceives of the process of technological innovation as one in which resources are brought to bear upon an array of prospects, each with its own associated sets of probabilities of costs and returns . . . . [A] prospect [is] a particular opportunity to develop a known technological possibility."<sup>69</sup> This view of the patent system comports well with the fact that "many technologically important patents . . . issue[] long before commercial exploitation [becomes] possible."<sup>70</sup> It is also in line with the understanding that substantial effort is required to transform an invention into a marketable innovation.<sup>71</sup>

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66. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 266 (1977); see also *Chicago Steel Foundry Co. v. Burnside Steel Foundry Co.*, 132 F.2d 812 (7th Cir. 1943) (recognizing that inventors seek patents for reward of patent monopoly).

67. The chemical, pharmaceutical, plastics, petroleum refining, and steel mill products industries have been identified as industries that rely heavily on patent protection to secure returns on investment in R&D. Levin, Klevorick, Nelson & Winter, *Appropriating the Returns from Industrial Research and Development*, in 3 BROOKINGS PAPERS ON ECONOMIC ACTIVITY 783, 796-97 (1987) [hereinafter *Appropriating Returns from R&D*]; accord Mansfield, *Patents and Innovation: An Empirical Study*, 32 MGMT. SCI. 173, 175 (1986) (pharmaceutical, chemical, and petroleum industries utilize patent protection substantially).

A reduction in patent protection would encourage use of trade secret protection and weaken the incentive to invest in R&D in these industries.

68. See Kitch, *supra* note 66, at 266 *passim*.

69. *Id.* at 266.

70. *Id.* at 267. The transistor, radar, and television are a few prominent examples of patented inventions that did not reach the market in commercially viable form until after patent expiration. See *id.* at 272 for a more complete listing. See also DeBrock, *Market Structure, Innovation, and Optimal Patent Life*, 28 J.L. & ECON. 223, 227 (1985) ("patents are almost always granted after relatively little progress toward the final innovation."). But see Beck, *The Prospect Theory of the Patent System and Underproductive Competition*, 5 RES. L. & ECON. 193 (1983) (patent law does not protect all or even many future developments of technology).

71. See *supra* note 7.

The patent laws encourage early filing of applications; thus, when patented, many inventions are far from being in commercially marketable form.<sup>72</sup> The prospect function of the patent system attracts investment in technological innovation by guaranteeing to an inventor a seventeen year period in which either to develop that technology into commercially viable form<sup>73</sup> or to license the invention to someone else to develop.<sup>74</sup> From this perspective, the patent system serves not so much to reward an inventor for coming up with a commercial product that benefits society as to encourage investors to devote capital to those R&D projects that look as though they will produce socially beneficial products in the future (i.e., result in a beneficial innovation).<sup>75</sup> A potential investor will be less willing to direct her capital resources toward the development of a new invention without at least some assurance of an unfettered opportunity to develop that invention into a commercially viable innovation in the future.

In addition to depriving a patentee of some compensation, an exemption for commercial experimental activity would also work to dissuade inventors from using patent law to protect their ideas, thus reducing the level of public disclosure of new inventions.<sup>76</sup> An expansive application of the experimental use exception would encourage inventors to resort to state trade secret protection<sup>77</sup> or perhaps no legal protection at all. For inventors who devise particularly complex inventions, the time it takes for a competitor to “reverse engineer”<sup>78</sup> and subsequently manufacture and market a competing product may

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72. See *Eli Lilly & Co. v. Medtronic*, 110 S. Ct. 2683, 2688 (1990) (“When an inventor makes a potentially useful discovery, he normally protects it by applying for a patent at once. Thus . . . the ‘clock’ on his patent term will be running even though he is not yet able to derive any profit from the invention.”).

73. “Only in the case of a patented product is a firm able to make the expenditures necessary to bring the advantages of the product to the attention of the customer without fear of competitive appropriation if the product proves successful.” *Kitch*, *supra* note 66, at 277.

74. It has been observed that “[e]fficient exploitation of a patent often requires patentees to license users of their inventions.” Note, *An Economic Analysis of Royalty Terms in Patent Licenses*, 67 MINN. L. REV. 1198, 1200 (1983); see also *id.* at 1226 n.166 (“Small corporations often need licensing since they lack the marketing organization necessary to commercialize an invention.”); J. LOWE & N. CRAWFORD, *INNOVATION & TECHNOLOGY TRANSFER FOR THE GROWING FIRM I* (1984) (“[Licensing] can be a central part of the firm’s innovation policy and as such is crucial to the firm’s survival and growth in the long and short term.”).

75. Thus, the question for a court is not whether a discovery, in its current form, is worth the grant of a seventeen year monopoly, but rather whether the information provided in the specification is worth further investigation and development. See *Kitch*, *supra* note 66, at 284.

76. See *Appropriating Returns from R&D*, *supra* note 67, at 805, where the authors note that “[t]he choice between obtaining a patent and maintaining secrecy may be influenced by the extent to which the disclosures made in the patent document facilitate inventing around the patent.” A broad experimental use allowance would encourage inventing around patented inventions and thus would discourage reliance on patent protection.

77. State trade secret laws allow firms to protect undisclosed industrial know-how from appropriation by competing firms. Reliance on trade secret protection necessarily implies that the information to be protected has not been revealed to the public. Such an option may be particularly appealing to the inventor of, say, a new manufacturing process, which others could easily duplicate once disclosed but whose nature is not revealed by the products that result from it.

78. Reverse engineering entails the deconstruction and analysis of a product or process to learn how it is designed and assembled.

offer greater protection than a patent law with a broad experimental use allowance. The latter would permit sophisticated competitors to use the information of the patent disclosure to experiment on the patented product in developing improvements or superior alternatives.<sup>79</sup> An expansive experimental use exception diminishes the patentee's ability to control the commercialization of her patented invention and thus to appropriate the returns on her investment in the R&D of the invention.<sup>80</sup> If competitors are allowed to appropriate the patented ideas of others for experimental purposes with a view toward developing competing products, the level of innovation will not increase, as those calling for a broad experimental use exception argue, but rather will decrease.<sup>81</sup>

A system with a broad experimental use allowance would have a disparate impact on less well-financed inventors whose ability to conduct R&D may be limited in the short term when they are not able to convince possible investors of the potential commercial success of their patented inventions. If larger, well-funded competitors are able to utilize the patented inventions of smaller inventors to develop their own patented alternatives, these smaller inventors will be less able to raise funds for R&D. The experimental use exception, thus, could very well have a dampening effect on small scale, highly speculative R&D inventive endeavors, which scholars have recognized as comprising a substantial portion of the overall innovative activity in the United States.<sup>82</sup>

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79. See Schlicher, *Some Thoughts on the Law and Economics of Licensing Biotechnology Patent and Related Property Rights in the United States*, 69 J. PAT. & TRADEMARK OFF. SOC'Y 263, 274 (1987) (allowing competitors free access may lead inventors of microorganisms to shun patent protection).

80. Yu, *Potential Competition and Contracting in Innovation*, 24 J.L. & ECON. 215, 237 (1981), notes (emphasis added):

To the extent that the patent protects only a physical form of the idea rather than the idea itself, inferior inventors can free ride by *improving* on the superior inventor's *crude models* . . . . Consequently, returns to early research will be noncapturable. A "perfect" patent system presumably can eliminate the problem by having the improvement inventor compensate the original inventor.

Allowing the experimental use exception for design around attempts and improvement attempts, which involves no compensation for the patentee, directly contradicts Yu's analysis.

81. See Letter from Donald J. Quigg, Assistant Secretary and Commissioner of Patents and Trademarks, to Representative Robert W. Kastenmeier in *Hearings*, *supra* note 40, at 189-90 ("The Administration would not favor legislation . . . codifying the experimental use . . . doctrine[], because it could diminish the strong incentive [to innovate] provided by the patent system."). See also Note, *supra* note 74, at 1200 & n.11 (describing how uncertainty is significant deterrent to R&D).

A broad experimental use allowance is akin to a limited compulsory license at a zero royalty rate. Compulsory licensing occurs when a court allows for the unlicensed use by others of a patented invention at a judicially determined rate of compensation to the patentee. Historically, courts have rarely ordered compulsory licensing. On the occasions that the courts have employed such a solution, they have done so to remedy antitrust violations. See, e.g., *United States v. United States Gypsum Co.*, 340 U.S. 76 (1950); *United States v. Hartford-Empire Co.*, 46 F. Supp. 541 (N.D. Ohio 1942).

82. After investigating the role of the small firm in the scheme of technological innovation, Scherer concludes, "studies show that small firms . . . continue to contribute significantly toward the creation of new products and processes." F.M. SCHERER, *supra* note 54, at 416-17; see J. LOWE & N. CRAWFORD, *supra* note 74, at 33 (reporting "that in the US . . . firms with less than 1000 employees accounted for only 6% of the total R&D spend [sic], but were responsible for 43% of innovation during the mid 1970s").

### C. *Incentives to Share*

In addition to failing to take into account the substantial negative effects a broad exception would have on the reward and prospect functions of the patent system, the arguments favoring an expansive application are based upon false assumptions. These arguments implicitly assume that inventors under the current patent regime lack adequate incentives to share the fruits of their innovative activities with one another and that most patents confer substantial market power on their holders. As the following discussion will demonstrate, these two assumptions are incorrect, and therefore the underlying rationale of those calling for an expanded reading of the exception is flawed.

Those calling for an expansive reading of the experimental use exception have pointed to the possible reluctance of patentees to license their inventions to competitors.<sup>83</sup> They claim that, in the absence of a commercially accessible embodiment, a potential competitor "would have just two choices: (1) proceed with the practice of the invention, thereby becoming an infringer and violating the law; or (2) wait 17 years to move science forward in that area."<sup>84</sup> This fear is unwarranted.

These commentators assume that companies lack significant incentives to enter into agreements to share their inventions and innovations.<sup>85</sup> Studies demonstrate that firms frequently license patented technology to one another.<sup>86</sup> In addition, theorists have suggested that firms will license minor innovations to one another after development.<sup>87</sup> The utilization of cross-licensing agreements<sup>88</sup>—whereby companies, before embarking on the potentially costly development of an invention, agree to share with one another the results of their

83. See Eisenberg, *supra* note 5, at 225; Israelsen, *supra* note 5, at 474 n.82.

84. Israelsen, *supra* note 5, at 474-75. Israelsen is assuming that when an inventor receives a patent, the invention already is in its commercially marketable form. But, as previously discussed, many important innovations are patented in only a crude form, and it may take several more years of R&D to complete the innovation process. See *supra* notes 68-81 and accompanying text.

85. This assumption is not correct. See J. LOWE & N. CRAWFORD, *supra* note 74, at 45 (observing that firm may license patents on technology it cannot itself exploit); Merges, *supra* note 7, at 868-69 ("Competing firms often cooperate in various ways to further mutual interests."); Note, *supra* note 74, at 1202 n.23 ("Often licensees can produce or market an invention more efficiently than the patentee [who] may not have the productive facilities to satisfy demand for a successful invention.")

86. See O.J. FIRESTONE, *ECONOMIC IMPLICATIONS OF PATENTS* 70 (noting that "the figures suggest that a rather large proportion of patented inventions are worked in Canada as a result of licensing agreements concluded both between related and unrelated firms") (footnotes omitted); J. LOWE & N. CRAWFORD, *supra* note 74, at 1 (observing that "[licensing] can be a central part of the firm's innovation policy and as such, is crucial to the firm's survival"); Note, *supra* note 74; cf. *Appropriating Returns from R&D*, *supra* note 67, at 806 (reporting, after survey of upper-level R&D executives, that they rated "[l]icensing . . . on average [as] an important way of gaining access to a rival's new technology")

87. Katz & Shapiro, *On the Licensing of Innovations*, 16 RAND J. ECON. 504 (1985); cf. Von Hippel, *Cooperation Between Rivals: Informal Know-How Trading*, 16 RES. POL'Y 291 (1987) (finding high degree of know-how trading in US steel "minimill" industry and possibly in many other industries).

88. See Katz, *An Analysis of Cooperative Research and Development*, 17 RAND J. ECON. 527 (1986) (describing how royalty-free cross-licensing schemes can increase efficiency of industry-wide R&D).

research efforts—contests such an assumption.<sup>89</sup> Firms cross-license and enter patent pools<sup>90</sup> because they fear that they will be *second* to come up with a drastic (i.e., market defining) innovation<sup>91</sup> and thus will be shut out of the market if they do not have guaranteed access to the innovation before its development.<sup>92</sup> Firms would rather risk losing possible monopolistic profits by contracting with each other than be excluded by a more efficient innovator's patent monopoly. The innovation process is not strictly one of exclusive competition, as those who call for expansive application of the experimental use exception implicitly suggest, but rather "[t]he innovation process involves a mix of competition in research and cooperative agreements to share the information gained from research."<sup>93</sup>

Another invalid premise of the arguments supporting expansive application of the exception is that a patent right necessarily confers inordinate market power on the patentee. But, this degree of power does not result from most patents<sup>94</sup> because a patentee's market power is greatly contingent upon other factors like the substitutability of other products or processes for the patented invention.<sup>95</sup> Even for a patentee who refuses *ex ante* to cross-license or patent pool, the existence of a high cross elasticity of demand (i.e., the ready availability of acceptable substitutes) for the final innovation may induce the inventor *ex post* to license the innovation to competitors. Thus, arguments based upon a fear of inordinate market power fail adequately to account for other variables that may affect a patentee's *actual* market power.

89. After studying the licensing behavior of Canadian firms, one author observed that "[t]he data suggest that cross-licensing is becoming increasingly accepted as a method of obtaining access to the patents held by other firms." O.J. FIRESTONE, *supra* note 86, at 76. That author also noted "that cross-licensing in Canada is a much more common practice among patentees from the United States . . . as compared with that followed by patentees of other countries . . ." *Id.*; see also F.M. SCHERER, *supra* note 54, at 452 ("Cross-licensing is a constructive means of avoiding stalemates between complementary patent portfolios."); Yu, *supra* note 80, at 234-36 (discussing incentive to create private agreements between inventors to share innovations, emphasizing role of cross-licensing and patent pools).

90. In a patent pool, "rights to important technology are contributed to a pool from which all industry members may draw." Merges, *supra* note 7, at 869.

91. See *id.* at 868 (noting that "most [firms] are 'risk averse' [and] take licenses to preserve a delicate balance of relations within an industry or to assure future licensing by rivals") (footnote omitted); Scherer, *The Economic Effects of Compulsory Patent Licensing*, in 2 FIN. AND ECON. 19 (Monograph series 1977) (reporting that "[t]here is . . . evidence from numerous studies of capital market behavior that firms are on average risk averse").

92. In their study of the licensing behavior of small and medium sized enterprises, Lowe and Crawford report that "grant backs and grant forwards were fairly common." J. LOWE & N. CRAWFORD, *supra* note 74, at 177 (footnote omitted). The authors note that "[g]rant backs/forwards denote those cases where licensees/licensors are obliged to divulge any developments of the technology to their licensors." *Id.*

93. Gallini & Winter, *Licensing in the Theory of Innovation*, 16 RAND J. ECON. 237 (1985).

94. See F.M. SCHERER, *supra* note 54, at 446 ("[F]ew patents are sufficiently basic and broad to 'fence in' a field altogether."); Klitzke, *Refusal to License: Monopolization Problems For Patent Owners*, 65 OR. L. REV. 745, 757 (1986) ("The vast majority of issued patents are for improvements over existing products and processes. The owner of an improvement patent does not have full control over market prices [and] may have little market power . . . .")

95. See Klitzke, *supra* note 94, at 749 (1986) ("[S]ubstitutability is measured by the cross-elasticity of demand, which is the degree of change in demand as the price changes.").

### III. AN APPROPRIATE COMPROMISE—LIMITED EXPERIMENTAL USE

As the foregoing discussion has demonstrated, neither law nor policy supports a broad experimental use exception. However, to evaluate thoroughly the proper breadth of the exception, one must consider all possible market scenarios, including those in which a patent confers market power, and the holder of such a "pioneer patent"<sup>96</sup> has the opportunity to utilize his patent rights to stifle the innovative activities of others. Patents are utilized extensively in the pharmaceutical industry<sup>97</sup> and are more likely to yield a high degree of market power<sup>98</sup> over a good with inelastic demand.<sup>99</sup> No doubt, for example, that when a cure for AIDS is developed, those with the disease will pay "whatever it takes" to gain access to the cure.<sup>100</sup>

A recent case frequently noted by commentators advocating expansive application of the exception, *Scripps Clinic v. Genentech, Inc.*,<sup>101</sup> involved a party with an inordinate amount of market power. This lawsuit involved a patented protein, Factor VIII:C, which is instrumental in the blood-clotting process and is used in the treatment of hemophilia. Plaintiff Scripps held a patent covering both a method for purifying Factor VIII:C from blood plasma and for a purified form of Factor VIII:C. Defendant Genentech used Scripps' purified Factor VIII:C to determine its amino acid sequence so that Genentech would be able to clone the Factor VIII:C gene. This would enable it to produce the protein through recombinant DNA processes, which would not infringe Scripps' purification patent. The trial court found Genentech's use of purified Factor VIII:C, in its attempt to develop a non-infringing alternative to Scripps' purification patent, to be an unauthorized use under section 271(a).<sup>102</sup>

*Scripps* can be interpreted as a case in which a patentee, who exercised considerable market power because it held a patent on a product that has no substitute, was able to hinder the development of a non-infringing alternative that most assuredly would have lowered the price of the product to the public,

96. See *id.* at 758 ("Pioneer patents initially protected the high prices of the first electronic calculators and video cassette recorders, until competitors were able to invent around the patents or the original patents expired.")

97. See *Appropriating Returns from R&D*, *supra* note 67, at 796 (noting that managers in drug industry rated patents as effective way to capture returns on both pharmaceutical products and processes); see also F.M. SCHERER, *supra* note 54, at 448 ("[W]ithout effective patent protection, R&D expenditures would be reduced . . . by 64 percent in pharmaceuticals (where imitation in the absence of patents [is] expected to be especially swift and effective).") (footnote omitted).

98. One author has noted that "[s]ome of the most extreme cases [of resource misallocation due to the patent system] concern the pricing of patented pharmaceutical items, for which demand is typically quite inelastic over a considerable price range." F.M. SCHERER, *supra* note 54, at 450.

99. "[T]he rate of decrease in sales in response to an increase in the firm's price . . . is the firm's elasticity of demand." P. AREEDA & L. KAPLOW, *supra* note 63, ¶ 340, at 569 n.16 (emphasis in original).

100. This phenomenon is occurring currently, to some degree, with the AIDS drug, AZT. See L.A. Times, Oct. 14, 1989, at 18, col. 1 (reporting call by Bush Administration for lower AIDS drug prices); see also *AZT Blazed the Trail for High-Priced Drugs*, Seattle Times, Apr. 19, 1990, at E1.

101. 666 F. Supp. 1379 (N.D. Cal. 1987).

102. 35 U.S.C. § 271(a) (1988); 666 F. Supp. at 1401.

thereby increasing its availability. Although this type of situation is disturbing, an indiscriminately applied experimental use exception is an inappropriate remedy.

A broad experimental use allowance, like that provided for in the recently proposed Competitiveness Act,<sup>103</sup> is overinclusive and would result in a decrease in innovative activity. This Note suggests that more particularized solutions be used to strike an appropriate compromise.<sup>104</sup> One solution is that Congress use its investigative resources to develop or commission a set of specific guidelines to determine the conditions under which experimental use is appropriate. These guidelines, which could be established by the Office of Technology Assessment or the Patent and Trademark Office should set out threshold conditions, which may vary among industries, that must be demonstrated for the exception "to attach." Thus, proper guidelines could be developed by market power tests that are industry specific.<sup>105</sup> These guidelines could then be used in infringement suits, whereby the defendant/competitor refers to the specific conditions to demonstrate that experimental use is justified.

Any weakening of the patent monopoly will discourage inventors from utilizing patent protection. If developed properly, however, the benefits from market power tests should outweigh this possible effect. Properly designed market power guidelines could strike a sensible balance between the right of an innovator to appropriate adequate returns on investment and that of the public to a steady flow of innovation. This desirable balancing effect would be most evident in those industries, like the drug industry, which rely heavily on patent protection. The returns attendant to control of a drug for which there is inelastic demand should still encourage drug innovators to utilize patent protection even if experimental use is permitted. In addition, drug innovators will still want to protect themselves during the lag-time before successful development and marketing of a non-infringing alternative.

In setting its priorities for which industries to target first for the development of market power guidelines, Congress could target for guideline development those industries that are of particular economic or social significance.<sup>106</sup>

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103. See *supra* notes 38-39 and accompanying text.

104. The Drug Price Competition and Patent Term Restoration Act of 1984 is a recent example of a narrowly tailored experimental use allowance, which addresses a specific problem (i.e., regulatory approval for medical devices). See *supra* note 28 and accompanying text.

105. See *Appropriating Returns from R&D*, *supra* note 67, at 816 ("[T]he incremental effects of policy changes should be assessed at the industry level."); see also *id.* at 818 ("Since the impact of legal protection of intellectual property depends on the strength of other appropriability mechanisms and varies widely among industries, focused efforts to solve problems in specific markets would be . . . prudent . . .").

106. This focus parallels the "public interest" rationale used to justify the compulsory licensing of "inventions relating to public health, welfare, or national defense—areas where the inventor's interest may be subordinate to that of the public." Comment, *supra* note 60, at 670. As mentioned above, *supra* note 81, the experimental use exception is akin to a compulsory license. See F.M. SCHERER, *supra* note 54, at 455, where that author notes: "In many nations no patent protection is given for drug entities, other chemical compounds, and foodstuffs. This is ostensibly done to protect the public from monopolistic exploitation on the purchase of vital staples."

For example, currently in the United States, the Clean Air Act provides for the compulsory licensing of patents on pollution control devices to those parties who cannot use substitutes to meet the pollution guidelines of the statute.<sup>107</sup>

Another suggested alternative is that Congress empower the courts to employ a modified experimental use exception whereby an inventor is paid a "reasonable royalty" by those who experiment on her patented innovation. This type of scheme treats experimental use as a type of limited compulsory licensing, whereby the experimenting party is recognized as having a limited license to experiment on a patented invention. In return for this privilege, the experimenter pays a royalty to the patentee. Under this paradigm, the royalty payment required from the experimenter could be tied to the commercial success of any innovation resulting from the experimental activity on the patented invention. An experimenter would only have to compensate the patentee when the experimental activity actually resulted in a benefit to the experimenter (thus, allowing "pure" scientific research to continue unhindered). Because experimental use will only dissuade an inventor from utilizing patent protection to the extent that an experimenting party is able to develop a competing product, a properly administered reasonable royalty regime should strike an optimal balance between the inventor's desire to appropriate the returns on her investment in R&D and the public's desire for a steady flow of innovations.

#### IV. CONCLUSION

The policies that underlie the patent laws and the behavior of firms that engage in innovation do not justify adoption of a broad experimental use exception. A liberal experimental allowance not only frustrates the reward and prospect functions of the patent laws but fails to recognize the incentives that firms have to license their patented technology to one another. Rather than spurring increased innovative activity, a broad experimental use exception would have just the opposite effect. In those rare cases in which a patentee is able to monopolize the use of a specific technology and thus stifle the innovative impulses of others, focused solutions are needed—solutions that respond to the empirical realities of the innovative process.

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In cases like *Scripps*, for example, the public interest in developing a less expensive way to produce Factor VIII:C for hemophiliacs supports allowing others to experiment on the patented invention in an attempt to develop non-infringing alternatives or improvements. That a patentee will be able to enjoy commercial monopoly power will help to minimize the expected decrease in the frequency with which patent protection is initially sought.

107. 42 U.S.C. § 7401 *et seq.* (1989). Additionally, the Canadian Patent Act allows for compulsory licensing of patents that apply to food preparation and patents on medicines. See Hayhurst, *Food for Thought: Compulsory Licensing of Patents*, 1 INTELL. PROP. J. 73 (1984).