PIONEERS IN TECHNOLOGY: A PROPOSED SYSTEM FOR CLASSIFYING AND REWARDING EXTRAORDINARY INVENTIONS

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I. INTRODUCTION

All inventions are not created equal. Take, for example, the telephone[1] and the toe puppet.[2] Both are the subjects of valid U.S. patents, but most would argue that the social value of the former greatly outweighs that of the latter. Should both patents be treated equally under the law? In general, an invention that brings extraordinary benefits to society probably deserves something more than the patent system's standard level of protection.[3]

A patent is essentially an exchange between an inventor and society. The inventor discloses a valuable invention and society rewards this effort with a limited monopoly.[4] One of the greatest challenges of the patent system is to ensure that this exchange is fair to both sides. Historically, courts have attempted to promote fairness by expanding the scope of monopoly protection under the doctrine of equivalents for certain meritorious classes of inventions.[5] Although never expressly overruled by the Supreme Court, this system has fallen into relative obscurity due to its lack of precision.[6] The law is currently unsettled on what significance, if any, should be attributed to a patent's pioneer status. This situation presents the perfect opportunity for a meaningful update.

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1. U.S. Patent No. 174,465 (issued Mar. 7, 1876).

2. U.S. Patent No. 5,830,035 (issued Nov. 3, 1998).

3. *See* Triax Co. v. Hartman Metal Fabricators, Inc., 479 F.2d 951, 958 (2d Cir. 1973) ("[S]ome inventions by their very nature deserve slightly more extensive legal protection than others . . . .").

4. Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 494 (1974) (Marshall, J., concurring).

5. *See generally* DONALD S. CHISUM, CHISUM ON PATENTS § 18.04[2][a] (1998).

6. *See* Paul R. Michel, *A Review Of Recent Decisions of the United States Court of Appeals for the Federal Circuit: Introduction: The Challenge Ahead: Increasing Predictability in Federal Circuit Jurisprudence for the New Century*, 43 AM. U. L. REV. 1231, 1237 (1994).

This Note proposes a new method for distinguishing the relative merit of inventions and for providing the most valuable inventions with additional protection. Rather than expanding protection under the doctrine of equivalents, the proposed method would increase damages for the infringement of certain meritorious patents. Like any reward in the patent system, this extra benefit would come at a cost to society. However, the societal cost of the proposed method would be less than the cost associated with a revitalization of the current system. The increase in damages would also be limited to the most valuable class of inventions: the pioneers. The overall approach, including the definition of pioneer inventions and the increase in damages, is designed to complement the modern infringement analysis. With a better system in place, courts may once again be willing to provide pioneer inventions with the extra incentives that they deserve.

Part II of this Note discusses how an invention's merit has historically been incorporated into the doctrine of equivalents analysis. Part III examines policy arguments for and against providing pioneer inventions with special treatment. Part IV looks at the current treatment of pioneer inventions within the doctrine of equivalents. Part V proposes a new definition of inventions that are truly worthy of pioneer status. Part VI proposes an incentive system for these inventions, one based on increased damages as opposed to an increased range of equivalents. Finally, Part VII offers some concluding remarks to encourage courts and legislators to find some way to reintroduce an assessment of merit into the patent system.

II. AN INVENTION'S MERIT AND THE DOCTRINE OF EQUIVALENTS

The American patent system relies primarily on peripheral claiming.[7] Inventors gain protection by using their patent claims to meticulously define the outer limits of their inventions.[8] Only competitive devices and processes that fall within those limits will be held to infringe.[9] The main advantage of this system is that the public receives clear notice of the boundaries of patented inventions.[10] This system allows businesses and individuals to make investment decisions regarding patented inventions with a high degree of certainty. However, a purely peripheral claiming system, where infringement rests solely on the plain meaning of the claim language, could allow uncompensated appropriation of an inventor's work in situations where the interests of justice clearly favor the inventor. The law tempers this harsh result with the doctrine of equivalents.[11]

The doctrine of equivalents is almost as old as the patent system itself. It was introduced 150 years ago in *Winans v. Denmead*.[12] In *Winans*, the plaintiff held a patent on a type of railroad car with a conical shape that made it more

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7. *See* Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1565–67 (Fed. Cir. 1995) (Nies, J., dissenting), *rev'd*, 520 U.S. 17 (1997).

8. *See id.* at 1565.

9. *See id.*

10. *See* Joseph S. Cianfrani, Note, *An Economic Analysis of the Doctrine of Equivalents*, 1 VA. J.L. & TECH. 1, 13 (1997).

11. Thomas & Betts Corp. v. Litton Sys., 720 F.2d 1572, 1579 (Fed. Cir. 1983).

12. 56 U.S. (15 How.) 330 (1853).

efficient for carrying coal.[13] The claim at issue in the plaintiff's patent specifically limited the protection to a railroad car "in the form of a frustum of a cone."[14] The defendant manufactured a railroad car that achieved the same benefits as the plaintiff's car, but was shaped as an octagon rather than a cone.[15] The Court held that infringement still existed, even though the defendant's design did not literally fall within the language of the plaintiff's claim.[16] In so holding, the Court recognized the inadequacies of language for the purpose of defining an invention[17] and the need for the law to protect substance over mere form.[18]

The doctrine of equivalents has been significantly refined since its roots in *Winans*, but at its core, it is still simply a way to determine infringement where the accused device or process does not literally meet the patent's claim limitations.[19] In the language of the courts, the doctrine is invoked to prevent the practice of "fraud on a patent."[20] The doctrine of equivalents can do justice, as demonstrated by *Winans*, but it also compromises the certainty of the peripheral claiming system.[21] If competitors cannot be sure about whether they will infringe a patent by creating a competing device or process, the development of the related technology will be hindered.[22] In some ways, a system that includes both peripheral claiming and the doctrine of equivalents is at war with itself. The lack of certainty within the system has led the Supreme Court and the Federal Circuit to cut back on the doctrine of equivalents by developing the prosecution history estoppel presumption[23] and by applying the doctrine on an element-by-element basis.[24]

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13. *Id.* at 339.
14. *Id.* at 342.
15. *Id.* at 340.
16. *Id.* at 344.
17. *See id.* at 343–44.
18. *See id.* The Court reasoned:

> Where form and substance are inseparable, it is enough to look at the form only. Where they are separable; where the whole substance of the invention may be copied in a different form, it is the duty of courts and juries to look through the form for the substance of the invention—for that which entitled the inventor to his patent, and which the patent was designed to secure; where that is found, there is an infringement; and it is not a defence that it is embodied in a form not described, and in terms claimed by the patentee.

Id. at 343.

19. *See* Graver Tank & Mfg. Co. v. Linde Air Prods. Co., 339 U.S. 605, 607–08 (1950).
20. *Id.* at 608.
21. Michel, *supra* note 6, at 1236–37.
22. *Id.* at 1241–42.
23. The doctrine of prosecution history estoppel can foreclose the doctrine of equivalents from applying to an element of the patented invention surrendered during prosecution. Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 30–34 (1997).
24. The doctrine of equivalents must be applied to each element of the patent claim individually. Only if the accused device or process exhibits an equivalent to all the elements will infringement be found. *Id.* at 29–30. Thus, competitors are able to avoid infringement by modifying or eliminating only one element of the patented invention.

Despite its drawbacks, the flexibility of the doctrine of equivalents has made it the primary tool of the courts for remedying the fundamental inadequacies of the peripheral claiming system.[25] One of these inadequacies is the inability of such a system to provide different levels of protection. By incorporating the doctrine of equivalents, variable protection becomes possible. At a very early stage in the history of the patent law, the courts developed the technique of differentiating the level of protection based on the value of the invention at issue.[26] Inventions of high value that were targeted for special treatment were labeled "pioneer" or "primary."[27]

The first Supreme Court case to suggest treating pioneer inventions differently under the doctrine of equivalents was *McCormick v. Talcott*.[28] However, *Morley Sewing Machine Co. v. Lancaster*[29] is recognized as the first case to actually make use of this new approach to infringement.[30] The plaintiff in *Morley Sewing Machine* held a patent for a machine used to sew buttons onto fabric.[31] The defendant's machine was generally similar, but the defendant was able to point to specific differences in the button-feeding and sewing mechanisms.[32] The lower court held that the plaintiff's patent did not give him the authority to prevent others from using the same combination of "instrumentalities"[33] and that sufficient differences existed between the two machines to prevent a finding of infringement.[34] The Supreme Court reversed the lower court and held that the plaintiff's patent was infringed.[35] Rather than merely rebutting the significance of the differences between the two machines, the Supreme Court explained that an expanded approach to the doctrine of equivalents

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25. *See generally* CHISUM, *supra* note 5, § 18.04.

26. *See generally id.* § 18.04[2][a].

27. B.F. Goodrich FlightSystems Inc. v. Insight Instruments Corp., 22 U.S.P.Q.2d 1832, 1837 (S.D. Ohio 1992).

28. 61 U.S. 402 (1857).

> If [the patentee] be the original inventor of the device or machine called the divider, he will have a right to treat as infringers all who make dividers operating on the same principle, and performing the same functions by analogous means or equivalent combinations, even though the infringing machine may be an improvement of the original, and patentable as such. But if the invention claimed be itself but an improvement on a known machine by a mere change of form or combination of parts, the patentee cannot treat another as an infringer who has improved the original machine by use of a different form or combination performing the same functions. The inventor of the first improvement cannot invoke the doctrine of equivalents to suppress all other improvements which are not mere colorable invasions of the first.

Id. at 405.

29. 129 U.S. 263 (1889).

30. CHISUM, *supra* note 5, § 18.04[2][b].

31. *Morley Sewing Mach.*, 129 U.S. at 265.

32. *Id.* at 273.

33. Morley Sewing-Mach. Co. v. Lancaster, 23 F. 344, 345 (C.C. Mass. 1885), *rev'd*, 129 U.S. 263 (1889).

34. *Id.* at 347.

35. *Morley Sewing Mach.*, 129 U.S. at 309.

was appropriate.[36] This approach was justified by the status of the plaintiff's invention as "the first . . . automatic machine for sewing buttons of the kind in question upon fabrics."[37]

Soon after the Supreme Court decided *Morley Sewing Machine*, it began to assess the merit of inventions as an essential step in the doctrine of equivalents analysis.[38] As a basic tenet, the Court held that "the range of equivalents depends upon and varies with the degree of invention."[39] As the lower courts applied this rule, a set of classifications arose for defining the "degree of invention."[40] Each class of patents was assigned a corresponding range of equivalents.[41] Pioneer patents were entitled to the broadest range of equivalents,[42] while significant improvements[43] and narrow improvements[44] were entitled to incrementally less protection.

Few analytical standards guided the early classification of patents. Some courts held that patents that merely combined existing technologies were *per se* narrow improvements,[45] but this rule was not universal.[46] For the most part, the assessment was done on an *ad hoc* basis.[47] Since every invention is unique, precedent was of little value. Once an invention was classified, applying the appropriate range of equivalents was another challenge. The essential similarities of the patented and accused inventions had to be conceptualized and limits had to be placed on the degrees of similarity that could qualify as infringement under a broad or narrow application of the doctrine.[48] Naturally, the results were unpredictable.

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36. *Id.* at 273.

37. *Id.*

38. *See, e.g.*, Cimiotti Unhairing Co. v. Am. Fur Ref. Co., 198 U.S. 399, 406 (1905).

> In determining the construction to be given to the claim in suit, which is alleged to be infringed, it is necessary to have in mind the nature of this patent, its character as a pioneer invention or otherwise, and the state of the art at the time when the invention was made.

Id.

39. Cont'l Paper Bag Co. v. E. Paper Bag Co., 210 U.S. 405, 415 (1908) (quoting Miller v. Eagle Mfg. Co., 151 U.S. 186, 207 (1894)).

40. CHISUM, *supra* note 5, § 18.04[2][a][ii].

41. *Id.*

42. *See, e.g.*, Shields v. Haliburton Co., 667 F.2d 1232, 1238 (5th Cir. 1982); Swanson v. Unarco Indus., Inc. 479 F.2d 664, 669 (10th Cir. 1973); McCullough Tool Co. v. Well Surveys, Inc., 343 F.2d 381, 401 (10th Cir. 1965).

43. *See, e.g.*, Thomas & Betts Corp., v. Litton Sys., 720 F.2d 1572, 1580 (Fed. Cir. 1983); Cont'l Oil Co. v. Cole, 634 F.2d 188, 198 (5th Cir. 1981).

44. *See, e.g.*, LaSalle v. Carlton's Laydown Serv., Inc., 680 F.2d 432 (5th Cir. 1982); Arvin Indus., Inc. v. Berns Air King Corp., 525 F.2d 182, 185 (7th Cir. 1975).

45. *See, e.g.*, Butex Gas Co. v. S. Steel Co. 123 F.2d 954, 956 (5th Cir. 1941).

46. *See, e.g.*, Nat'l Hollow Brake-Beam Co. v. Interchangeable Brake-Beam Co. 106 F. 693, 711 (8th Cir. 1901).

47. *See, e.g.*, Hildreth v. Mastoras, 257 U.S. 27 (1921).

48. *See, e.g.*, Boyden Power-Brake Co. v. Westinghouse, 170 U.S. 537, 568–73 (1898).

Sessions v. Romadka[49] is indicative of the early, unpredictable approach to pioneer inventions. In this case, the plaintiff alleged infringement of a claim for a spring-based device to hold trunks shut.[50] The Court noted that the device was in "almost universal use" and therefore designated it as a pioneer.[51] The public's speedy adoption of the device was the only justification cited for this holding.[52] The Court held that the plaintiff's patent was entitled to "a liberal construction" of the claims because it was a pioneer.[53] The defendant was found to have infringed even though there were some technical dissimilarities between the two devices.[54] The Court did not address the question of whether the defendant would have infringed the patent if it had not been afforded pioneer status.

Starting with *Graver Tank & Manufacturing Co. v. Linde Air Products Co.*[55] in 1950, the doctrine of equivalents has been refined, but the favored treatment of pioneer inventions has been left out of the developing analytical framework.[56] Both the classification of inventions as pioneers and their resulting treatment under the doctrine of equivalents have never been substantiated by meaningful standards. Rather than refining this approach to pioneer inventions, the Federal Circuit, since its inception in 1982, has de-emphasized its importance.[57] As a result, the modern analysis that is used to apply the doctrine of equivalents has overshadowed the vague and antiquated notions surrounding pioneer inventions.

III. POLICY ARGUMENTS FOR AND AGAINST DISTINGUISHING PIONEER INVENTIONS

In the American patent system, the Patent and Trademark Office only allows claims if they are novel,[58] useful,[59] and non-obvious.[60] The non-obvious requirement is usually the most significant obstacle to obtaining patent protection.[61] It is judged on whether the "differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."[62] Pioneer inventions

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49. 145 U.S. 29 (1892).
50. *Id.* at 40.
51. *Id.* at 45.
52. *Id.*
53. *Id.*
54. *Id.* at 44–45.
55. Cianfrani, *supra* note 10, at 12.
56. *See* Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1519–20 (Fed. Cir. 1995), *rev'd*, 520 U.S. 17 (1997) (listing factors relevant to the doctrine of equivalents analysis, but failing to include pioneer status).
57. *See* Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1261 n.7 (Fed. Cir. 1989); Sun Studs, Inc. v. ATA Equip. Leasing, Inc., 872 F.2d 978, 987 (Fed. Cir. 1989).
58. 35 U.S.C. § 102 (2001).
59. *Id.*
60. 35 U.S.C. § 103 (2001).
61. CHISUM, *supra* note 5, § 5.02[6].
62. 35 U.S.C. § 103.

have an advantage in meeting this test because they usually involve technical areas where the prior art is limited or non-existent. Thus, the claims drafter for a pioneer invention can often use broad language without encountering obviousness problems.[63] In light of this advantage, the Federal Circuit has recently questioned why pioneer inventions deserve additional advantages under the doctrine of equivalents.[64]

Despite such skepticism, the policy behind the special treatment of pioneer inventions is actually very sound. These inventions may have less prior art to obstruct the claims, but writing claims and enabling disclosures in a new technical area can also present some unique challenges.[65] When a pioneer invention opens up a new technical area, the possibilities for development in that area are difficult to anticipate. The patent drafter can easily overlook all the ways in which a seemingly essential feature of the invention can be redesigned to produce the same result without infringing. In contrast to a mere improvement, a pioneer invention usually has more features that are untested. Each of these features provides an opportunity for a competitor to modify the invention and avoid the claim language. The patent system must compensate for this inequality by treating pioneer inventions differently.[66]

Pioneer inventions also deserve additional protection to adequately compensate the inventor for her contribution to society. This additional protection would serve as an extra incentive for the economic investment that is required to create a pioneer invention. Some might argue that an inventor has no control over whether any given invention will be a pioneer, thus rendering the extra incentive meaningless. However, when the organizations behind innovation structure their research and development programs, they must consider the marginal benefits of their investments. With greater value afforded to pioneer inventions, these organizations will be more likely to direct research and development toward the most challenging technical problems, where the risk of failure is great.[67] This type

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63. *See* Beckson Marine, Inc. v. NMF, Inc., 292 F.3d 718, 725–26 (Fed. Cir. 2002) (discussing the relationship between the obviousness determination and the prior art).

64. *See* Augustine Med., Inc. v. Gaymar Indus., Inc., 181 F.3d 1291, 1301 (Fed. Cir. 1999) ("[The] claim scope itself generally supplies broader exclusive entitlements to the pioneer [than pioneer status under the doctrine of equivalents]."); Autogiro Co. of Am. v. United States, 384 F.2d 391 (Ct. Cl. 1967).

65. *See* Moore v. United States, 211 U.S.P.Q. 800 (Ct. Cl. 1981) ("[D]rafting the disclosure and claims for a pioneer patent is a difficult task because of the new scientific ground being broken by the unique invention.").

66. *See In re* Hogan, 559 F.2d 595, 606 (C.C.P.A. 1977).

> To restrict [a pioneer patent to the scope of its original written description] would be a poor way to stimulate invention, and particularly to encourage its early disclosure. To demand such restriction is merely to state a policy against broad protection for pioneer inventions, a policy both shortsighted and unsound from the standpoint of promoting progress in the useful arts, the constitutional purpose of the patent laws.

Id.

67. A. Samuel Oddi, *The International Patent System and Third World Development: Reality or Myth?*, 1987 DUKE L.J. 831, 838.

of investment drives technological advancement[68] and it should be given an incentive commensurate with its value.

Issues of justice also support expanded protection for pioneer inventions. Such inventions usually have a greater potential for generating profits, as compared to ordinary inventions. When potential profits are high, competitors are more likely to challenge a patent's limits and validity, either through litigation or by attempting design arounds.[69] Competitive products are often made possible only by the innovation of the pioneer inventor. If such products avoid infringement, they have the potential to completely cut off the pioneer from profits in the field or at least reduce the pioneer's market share. Such a result is particularly unjust when the invention that is cut off was responsible for creating the market.

Giving pioneer inventions broad protection also entails some potential disadvantages. Granting a broad monopoly in a fresh technology to one party arguably impedes the development of that technology.[70] But while there may be more room for valuable improvements when a technology is new,[71] it is not at all clear that the presence of a broad blocking patent always stifles these early improvements.[72] It is usually in the patent holder's interest to readily license the technology[73] and, if the technology is widely disseminated, the value of improvements will not be diminished. Nevertheless, the potential effect of expanded protection for pioneer inventions on the pace of technical development is a legitimate concern.

The economic analysis that justifies the special treatment of pioneer inventions is the same analysis that applies to the patent system in general. It is well settled that the societal value of encouraging invention is worth the societal costs associated with the resulting monopolies.[74] Providing extra incentives to pioneer inventions may increase the societal costs, but the value of these

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68. *See* Diamond v. Chakrabarty, 447 U.S. 303, 316 (1980) ("[T]he inventions most benefiting mankind are those that 'push back the frontiers of chemistry, physics, and the like.'") (quoting Great A. & P. Tea Co. v. Supermarket Corp., 340 U.S. 147, 154 (1950)).

69. A design around is a device or process specifically designed to avoid the claim language of an existing patent.

70. *See* Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 909 (1990).

71. *See generally* Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75 (1994).

72. John P. Walsh et al., *Working Through the Patent Problem*, 299 SCI. 1021, 1021 (2003) (In an extensive survey of attorneys, scientists and managers, the authors found that "almost none of [the] respondents reported worthwhile projects being stopped because of issues of access to IP rights and research tools.").

73. *See* Edmund Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 279 (1977).

74. *See generally* Richard R. Nelson, *The Economics of Invention: A Survey of the Literature*, 32 J. BUS. 101 (1959); Edwin Mansfield, *Patents and Innovation: An Empirical Study*, 32 MGMT. SCI. 173 (1986); Timothy J. Douros, *Lending the Federal Circuit A Hand: An Economic Interpretation of the Doctrine of Equivalents*, 10 HIGH TECH. L.J. 321 (1995).

inventions is also greater.[75] Looking back at the history of technology, pioneer inventions have always stood out from the rest.[76] Examples of great pioneer inventions include the sewing machine, the telephone, and the transistor. Vast economic empires have been built upon a few truly innovative inventions. With this potential in mind, the implementation of a system that may hasten the arrival of the next technical revolution is a worthwhile endeavor.

IV. THE CURRENT STATE OF THE RANGE OF EQUIVALENTS APPROACH

In *Graver Tank*, the Supreme Court created a uniform standard to help clarify the application of the doctrine of equivalents. According to the Court, "a patentee may invoke this doctrine to proceed against the producer of a device 'if it performs substantially the same function in substantially the same way to obtain the same result.'"[77] As it presented the "function-way-result" analytical framework, the Supreme Court also cautioned that it was not a panacea for the uncertainties of the system and that, in practice, the infringement analysis should not be restricted by any formula.[78] However, the lower courts were eager to simplify the infringement analysis and they quickly adopted the function-way-result test as the standard approach.[79] Since the range of equivalents concept does not fit neatly into the analysis presented by *Graver Tank*,[80] the significance of assessing the merits of patented inventions slowly diminished.[81]

Under the current system, if an invention is classified as a pioneer, the fact finder must conceptualize an appropriate range of equivalents and then somehow incorporate this concept into the function-way-result analysis. However, it is difficult to design a jury instruction that will facilitate the integration of these concepts. Perhaps the most logical approach is to define "substantially the same" more liberally when the range of equivalents is expanded, but since the jury has no way to know where the baseline for substantial similarity exists, a modification of that baseline is likely to be meaningless.[82]

Even the classification of an invention as a pioneer is a challenge within the current system. The standards that serve as the basis for this classification are

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75. *See supra* text accompanying note 68.

76. *See* Boyden Power-Brake Co. v. Westinghouse, 190 U.S. 537, 562 (1898).

77. Graver Tank & Mfg. Co. v. Linde Air Products Co., 339 U.S. 608 (1950) (quoting Sanitary Refrigerator Co. v. Winters, 280 U.S. 30, 42 (1929)).

78. *Id.*

79. *See* Christina Y. Lai, Note, *A Dysfunctional Formalism: How Modern Courts Are Undermining the Doctrine of Equivalents*, 44 UCLA L. REV. 2031, 2043–44 (1997).

80. *See In re* Certain Doxorubicin, 20 U.S.P.Q.2d 1602, 1608 (U.S. Int'l Trade Comm'n 1991) ("[T]he concept of a 'range' of equivalents is of limited usefulness. It is not a substitute for the equivalents analysis set out in *Graver Tank*." (citations omitted)).

81. *See* Esther Steinhauer, Note, *Using the Doctrine of Equivalents to Provide Broad Protection for Pioneer Patents: Limited Protections for Improvement Patents*, 12 PACE L. REV. 491, 508 (1992).

82. Michel, *supra* note 6, at 1237–38.

inconsistent and vague.[83] The Supreme Court has defined a pioneer patent as "a patent covering a function never before performed, a wholly novel device, or one of such novelty and importance as to mark a distinct step in the progress of the art."[84] The Supreme Court later altered its prior definition and gave broad protection under the doctrine of equivalents to an improvement patent, noting that it was "meritorious" and that it had attained "a large measure of commercial success."[85] Together, these cases indicate that a pioneer can be a wholly novel invention or merely a meritorious improvement of an existing invention.[86] Within current case law, the only criterion for obtaining pioneer status seems to be a subjective finding that the invention exhibits some form of merit.

The Supreme Court has offered little guidance regarding the application of the pioneer invention doctrine in modern times. In 1997, the Court hinted at the continued viability of the doctrine by citing it to rebut a claim that the doctrine of equivalents should be abandoned.[87] Still, despite the apparent viability of the pioneer invention doctrine, the Federal Circuit has generally chosen to dismiss its significance.[88] *Texas Instruments, Inc. v. United States International Trade Commission*[89] is an example of a Federal Circuit case that refused to defer to the doctrine's formidable history. In response to the plaintiff's assertion that its patent was a pioneer, the Federal Circuit explicitly stated that such a classification of the invention did not make any difference in the infringement analysis.[90] According to the court, any historical difference in the treatment of pioneer inventions stemmed from the sparseness of the prior art relevant to such inventions and not from a "manifestation of a different legal standard based on an abstract legal concept."[91]

The practical difficulties of classifying pioneer inventions and providing them with expanded protection, combined with the Federal Circuit's reluctance to apply a different standard to pioneer inventions,[92] leave little incentive for modern patent holders to argue for pioneer status. Therefore, it is not surprising that the merits of patented inventions are rarely assessed in modern case law.

V. A BETTER WAY TO CLASSIFY INVENTIONS

An update of the pioneer invention doctrine begins by overhauling the process by which pioneer inventions are identified. The system will only work if

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83. *See* Augustine Med., Inc. v. Gaymar Indus., Inc., 181 F.3d 1291, 1301 (Fed. Cir. 1999) ("[N]o objective legal test separates pioneers from non-pioneers.").

84. Boyden Power-Brake Co. v. Westinghouse, 170 U.S. 537, 561–62 (1898).

85. Sanitary Refrigerator Co. v. Winters, 280 U.S. 30, 40 (1929).

86. Steinhauer, *supra* note 81, at 503–04.

87. Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 27 n.4 (1997) ("[J]udicial recognition of so-called 'pioneer' patents suggests that the abandonment of 'central' claiming may be overstated.").

88. Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1261 n.7 (Fed. Cir. 1989); Sun Studs, Inc. v. ATA Equip. Leasing, Inc., 872 F.2d 978, 987 (Fed. Cir. 1989).

89. 846 F.2d 1369, 1370 (Fed. Cir. 1988).

90. *Id.*

91. *Id.*

92. *See Corning Glass Works*, 868 F.2d at 1261 n.7; *Sun Studs*, 872 F.2d at 987.

the inventions that are given added protection are also those that society values most. Previous methods for classifying pioneer inventions have been unpredictable.[93] Different courts used different criteria and did not even apply the same criteria consistently.[94]

One of the obstacles to improving predictability is the speculation that is inherent in any assessment of an invention's potential. This is difficult to avoid, but a system that emphasizes tangible evidence can be developed to lessen the need for speculation. Since few standards steered the classification of pioneer inventions in the past, the mere adoption of a uniform system would go a long way towards improving predictability. An additional benefit can be gained by structuring the system to focus on the factors that involve the least amount of speculation. The following discussion identifies one potential system.

A. Pioneer Status as a Question of Law

Framing the determination of pioneer status as a question of law supports uniformity within a classification system for pioneer inventions. This change is not an unreasonable proposition, as the Supreme Court has been expanding the courts' role in patent infringement litigation. In *Markman v. Westview Instruments, Inc.*,[95] the Supreme Court held that judges should interpret patent claims.[96] In making this determination, the Court reasoned that judges are likely to be more skilled at claim interpretation than jurors[97] and that shifting the determination to judges would increase uniformity within the system.[98] A similar reasoning applies to the classification of patents as pioneers. With this determination left to a jury with no clear standards, there is no way for businesses to predict which patents will qualify for expanded protection. But if judges apply the law, predictability will improve and businesses will be able to make better choices about whether to license patented technologies or design around them.

The primary obstacle to framing pioneer status as a question of law is the Seventh Amendment to the U.S. Constitution. The Seventh Amendment provides that "[i]n suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved . . . ."[99] In *Markman*, the Court analyzed the history of the Seventh Amendment to determine if claim construction was a "suit at common law" at the time the Constitution was drafted or if it was at least analogous to such a suit.[100] Although previous cases had invariably reserved the ultimate finding of infringement for the jury,[101] the Court concluded that the

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93. *See supra* text accompanying notes 83–86.
94. *See supra* text accompanying notes 45–54.
95. 517 U.S. 370 (1996).
96. *Id.* at 372.
97. *Id.* at 388–89.
98. *See id.* at 390–91.
99. U.S. CONST. amend. VII.
100. *Markman*, 517 U.S. at 376–88.
101. *Id.* at 377 ("[T]here is no dispute that infringement cases today must be tried to a jury, as their predecessors were more than two centuries ago.").

case law provided no clear directive on the issue of claim construction.[102] The Court then looked to practical considerations, which favored making claim construction a question of law.[103] It is significant that the Court was able to distinguish claim construction from the ultimate issue of infringement. Like claim construction, the determination of pioneer status is separable from the issues reserved for the jury. Also like claim construction, the practical considerations weigh strongly in favor of making it a question of law.[104]

B. Potential Criteria

Regardless of whether a judge or a jury determines an invention's pioneer status, meaningful standards are necessary. These standards have the greatest potential to increase predictability in the system and to ensure that the rewards of pioneer status are applied in a manner that is consistent with the objectives of the doctrine. Under the current approach, any factor is relevant to the determination of pioneer status.[105] Rather than continue with this approach, it makes more sense to look at each factor that may affect the determination to see if that factor is consistent with the objectives of the doctrine.

In keeping with the true definition of the word "pioneer,"[106] the courts originally reserved pioneer status for inventions that existed in fields uncrowded by prior art.[107] The courts later began to extend pioneer status to improvements of existing inventions.[108] The expansion of the doctrine to include improvements diluted its effectiveness and compromised some of its original goals.[109] True pioneer inventions should be distinguished from improvements and additional protection should only be available to the former. There are several reasons for making this distinction. First, only those inventions that break new ground in the art will experience the special challenges of claims drafting.[110] Second, inventions that break new ground are more in need of incentives than improvements. Unlike improvements, inventions in an uncrowded field cannot rely on established markets.[111] Investment in totally new fields is much more speculative than investment in the improvement of existing inventions.[112] Both forms of investment have societal value, but the additional risk associated with investment in groundbreaking research necessitates some form of supplemental incentive.

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102. *Id.* at 388–91.

103. *See supra* text accompanying notes 97–98.

104. *See supra* Part III.

105. *See supra* text accompanying notes 83–86.

106. WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1721 (1966) ("A person or group that originates or helps open up a new line of thought or activity or a new method or technical development.").

107. *See, e.g.*, Morley Sewing Mach. Co. v. Lancaster, 129 U.S. 263, 273 (1889).

108. *See, e.g.*, Cont'l Paper Bag Co. v. E. Paper Bag Co., 210 U.S. 405, 415 (1908).

109. *See* Steinhauer, *supra* note 81, at 528.

110. *Supra* text accompanying notes 65–66.

111. Oddi, *supra* note 67.

112. *See* F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 708–09 (2000).

Despite the importance of breaking new ground in technology, pioneer status cannot be granted to all inventions that accomplish this goal. If pioneer status were to be granted to all inventions that are created in entirely new technical areas, it would promote a race to anticipate future technical developments and inventors would file patents of questionable utility in untested technologies. Of course, the utility and obviousness requirements of the patent screening process would eliminate many of these patents, but not all. In order to ensure that only the most deserving inventions receive the extra protection of pioneer status, additional factors must be incorporated into the analysis.

One of the factors that courts often use to determine whether an invention should be granted an expanded range of equivalents is its technical merit.[113] This factor has been used to justify an expanded range of equivalents for patents on inventions in new fields[114] as well as for improvements.[115] Considering the technical merits of an invention addresses the incentive objective of the pioneer invention doctrine. The economic and societal value of inventions of high technical merit is usually greater than the economic and societal value of ordinary inventions, but this correlation is not absolute. Some inventions may be ingenious but have very little value.[116]

Perhaps the biggest problem with relying on technical merit to qualify pioneer status is its application. The determination of technical merit is a significant challenge for a lay jury or even for a court.[117] Expert witnesses can aid in the assessment of technical merit, but their findings are still highly subjective. The main reason for a new framework for defining pioneer inventions is to improve predictability. Basing this analysis on a subjective determination of technical merit does not support this goal.

In addition to technical merit, a few cases have examined the economic impact of a patented invention in order to assess the appropriateness of pioneer status.[118] Courts have been especially eager to cite this factor when denying an

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113. *See* Starr v. Houser, 194 F. 730, 730 (C.C. Ohio 1911) (granting a wide range of mechanical equivalents to a devise described as "a wonderful invention" demonstrating "inventive genius of a high order."); Eibel Process Co. v. Minn. & Ont. Paper Co., 261 U.S. 45, 63 (1923) (commenting that the invention at issue should be given an expanded range of equivalents because "we think that Eibel made a very useful discovery, which has substantially advanced the art").

114. *See, e.g.*, *Starr*, 194 F. at 730.

115. *See, e.g.*, *Eibel Process*, 261 U.S. at 63.

116. *See, e.g.*, Borland v. N. Trust Safe Deposit Co., 212 F. 178, 181 (N.D. Ill. 1914) (noting that the invention under consideration was "ingenious," but "its practical usefulness [was] doubtful").

117. *See* Augustine Med., Inc. v. Gaymar Indus., Inc., 181 F.3d 1291, 1301 (Fed. Cir. 1999) ("[I]t is impossible for this court or the PTO to predict the future of any given technology and thereby determine the likelihood that an invention will open vast new vistas of information.").

118. *See, e.g.*, Hildreth v. Mastoras, 257 U.S. 27, 34 (1921) (justifying pioneer status for a candy-pulling machine, and stating that "[t]he ultimate effect of [the patented device] was to make candy pulling more sanitary, to reduce its cost to one-tenth of what it had been before him, and to enlarge the field of art"); Sessions v. Romadka, 145 U.S. 29, 45 (1892); Hartford-Empire Co. v. Swindell Bros., Inc., 96 F.2d 227, 229–30 (4th Cir. 1938).

expanded range of equivalents to patents that were never commercially utilized, a class referred to as "paper patents."[119] The expanded range of equivalents is denied to these patents because their potential economic benefit has been stifled by the patent owner's inactivity.[120] The paper patent exclusion hints that only inventions with a positive economic impact should be eligible for pioneer status.

One simple way to measure the economic impact of an invention is to assess its commercial success. In most cases, an invention's commercial success correlates accurately with its economic impact, but sometimes a deeper analysis is appropriate. The overall assessment can also consider the efficiencies achieved by the invention and the impact of its spin-off technologies.

Beyond economic impact, some inventions also have an important societal impact. This category includes all those benefits of an invention that are difficult to quantify in economic terms. For instance, some inventions fulfill a long-felt need, but may not be rewarded with commercial success. Pioneer status should be considered for these inventions as well.

Both commercial success and fulfillment of a long-felt need are already recognized as secondary considerations in the obviousness analysis.[121] Their use in this capacity should not be confused with their proposed use for determining pioneer status. Commercial success, in particular, has been heavily criticized for its imprecise correlation with obviousness,[122] but its correlation to an invention's intrinsic value is much more accurate. People presumably buy products because those products have value, not because those products represent non-obvious advancements in technology.

The problem that arises in both applications of commercial success is determining whether the invention itself is driving its success or whether the success is based on unrelated factors, such as marketing.[123] To address this concern, the Federal Circuit has required that secondary considerations like commercial success exhibit a sufficient nexus to the invention in question.[124] This requirement should also apply to the proposed use of these factors to determine pioneer status. One advantage of importing secondary considerations from the obviousness analysis is that established case law has already defined them.[125] This case law can be carried over to guide the application of these factors in the classification of pioneer inventions.

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119. *See* Lockwood v. Langendorf United Bakeries, Inc., 324 F.2d 82, 88 (9th Cir. 1963).

120. *See* Glendenning v. Mack, 159 F. Supp. 665, 668 (D. Minn. 1958).

121. *See* Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966).

122. *See* Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CAL. L. REV. 805, 838–39 (1988).

123. *See id.*

124. *See, e.g.*, Simmons Fastener Corp. v. Ill. Tool Works, Inc., 739 F.2d at 1573, 1575 (Fed. Cir. 1984).

125. *See supra* text accompanying note 121.

C. A Definitive Test

A variety of considerations for the classification of pioneer inventions have appeared in the case law. However, in order to improve the predictability of the doctrine and facilitate its application, these considerations must be reduced to a definitive test. The proposed test consists of two elements. The first element requires that the invention exist in an uncrowded field. The second element is bifurcated according to the maturity of the invention. Patents that are litigated within five years from the date of filing may satisfy the second element by exhibiting a high degree of technical merit and/or a substantially beneficial societal or economic impact. Patents that are litigated after five years from the date of filing can satisfy the second element only by exhibiting a substantially beneficial societal or economic impact.

1. The First Element—Existence in an Uncrowded Field

The first question arising from this proposed test should be how to determine if an invention exists in an uncrowded field. The idea that an invention only exists in an uncrowded field if it breaks new ground in technology is not adequate. All inventions build on existing technology to varying degrees.[126] The first light bulb incorporated the known technology of electrical circuitry; yet few would argue that it existed in a crowded field. The presence of other inventions that tackle the same problem or even achieve the same results also should not foreclose a finding that an invention exists in an uncrowded field. Such competing inventions may be based on technology that is completely unrelated to the invention in question.

In deciding on an appropriate standard for the "uncrowded field" element, it is helpful to consider the shared characteristics of past pioneer inventions. The inventions of the past that invariably stand out as pioneers represent broad conceptual leaps outside of the paradigms of established technologies. For an invention to exist in an uncrowded field, nothing that vaguely suggests the invention must exist. All patentable inventions must be non-obvious, but pioneer inventions go far beyond merely meeting this standard to represent truly revolutionary thinking. As a rough guide to the assessment of this factor, courts could use the existing considerations for obviousness and merely raise the bar to a higher level.

Developments in science often open the door to new technical advancements. For the purpose of classifying pioneer inventions under the proposed method, such developments exist in the same field as the inventions they spawn. Thus, the inventions that arise naturally from a publicly known scientific development will not exist in an uncrowded field and therefore cannot achieve pioneer status. Otherwise, the bargain with the public would be lopsided with these inventions. It would be unfair to expand patent protection for inventions that are likely to be developed with or without any extra incentive.

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126. *See* Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSP. 29 (1991).

Determining if an invention exists in an uncrowded field involves a careful analysis of the prior art. Courts have little expertise in specific technologies, so it makes sense to establish a rebuttable presumption on whether this element is satisfied while the patent application is being examined. Since the examiner already has to analyze the prior art to make a ruling on non-obviousness,[127] she will have the knowledge required to effectively determine if the invention exists in an uncrowded field. Having the examiner make this determination also facilitates public notice. Patents presumptively found to exist in an uncrowded field can be given a special identifier. Members of the public would then be able to immediately ascertain which patents satisfy this element and are likely to carry the additional protections that accompany pioneer status.

2. The Second Element—Merit

The second element of the proposed test uses a bright line rule to differentiate between two analytical approaches. This ensures that technical merit is an acceptable standard only for recent inventions. Since technical merit is highly speculative,[128] it is wise to limit its application as much as possible. Another purpose of the bright line rule is to encourage inventors to aggressively make use of their inventions during the first five years after filing. The proposed test creates this incentive because only those inventions that achieve a substantially positive societal and/or economic impact after the first five years will be eligible for pioneer status. Such an impact only comes about through the promotion and dissemination of the invention. Even if an invention has amazing potential, it cannot qualify for pioneer status under the proposed test unless it begins to realize that potential within the first five years. This approach essentially tackles the same problem that the denial of pioneer status to paper patents addresses.[129] The benefit of an invention is maximized when it is freely applied and improved upon by others during its early life.[130]

Despite the bright line approach to foreclose an evaluation of technical merit from litigation initiated after an invention's first five years, such an evaluation is unavoidable for inventions that have not had sufficient time to become established. An assessment of technical merit is highly subjective and precedent is of little value,[131] but a few criteria can help steer the analysis. The assessment should focus on how successfully the invention achieves a solution to the problem it addresses. The efficiency and elegance of this solution are the key factors. To reduce speculation, the analysis should consider only the known applications of the invention.

The majority of litigated patents seeking pioneer status will be able to satisfy the second element only if they directly result in a substantially positive societal or economic impact. This factor is much more predictable than technical merit. The impact of certain inventions is well known within the technical

127. 35 U.S.C. § 103 (2001).
128. *See supra* text accompanying notes 116–17.
129. *See supra* text accompanying notes 119–20.
130. *See* Merges & Nelson, *supra* note 70, at 878–79.
131. *Supra* text accompanying notes 116–17.

community and often within the community at large. Economic impact is especially easy to prove with tangible evidence, such as statistics on improved efficiencies, previously unknown applications, and sales. Precedent is capable of guiding the assessment of economic impact, as even very different inventions will share points of comparison.

VI. A BETTER INCENTIVE FOR PIONEER INVENTIONS

If a litigated patent is defined as a pioneer under the proposed test, some extra protection must then attach. The vague range of equivalents approach does not comport well with the modern doctrine of equivalents analysis[132] and courts have rarely used it over the last fifty years.[133] A redesigned approach to rewarding pioneer inventions should offer a meaningful incentive that is predictable, easy to apply, and not an undue obstacle to the development of improvements and tangential technologies.

A. An Alternative to the Expanded Range of Equivalents

The starting point in determining an appropriate means of granting pioneer patents special treatment is to critically assess the existing system. Is expanded protection under the doctrine of equivalents the proper reward for achieving pioneer status? Courts have assumed this to be the case ever since the inception of the doctrine of equivalents.[134] However, this form of incentive compromises the predictability of the system. Although the doctrine of equivalents was intended to be flexible, the case law developed clear boundaries.[135] Applying an expanded range of equivalents is, in effect, dismissing the established boundaries and adopting a unique and unpredictable definition of infringement. Without knowing where the line between infringement and non-infringement lies, competitors are less able to make clear decisions about licensing. This uncertainty, more than the burden of licensing itself, inhibits the efficient development of new technologies.[136]

In light of legitimate concerns about the slowing of technical development by expanding the range of equivalents[137] and the modern trend toward restricting the doctrine of equivalents,[138] an investigation into alternative incentive systems is reasonable. However, the possibilities are limited. Patents grant a negative right; they only operate by preventing others from making, using,

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132. *See In re* Certain Doxorubicin, 20 U.S.P.Q.2d 1602, 1608 (U.S. Int'l Trade Comm'n 1991).

133. Steinhauer, *supra* note 81.

134. *See generally* CHISUM, *supra* note 5, § 18.04.

135. *See supra* text accompanying note 77.

136. *See* Markman v. Westview Instruments, Inc., 517 U.S. 370, 390 (1996) (quoting Union Carbon Co. v. Binney & Smith Co., 317 U.S. 228, 236 (1942)) ("[The] zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims . . . discourage[s] invention only a little less than unequivocal foreclosure of the field.").

137. *See* Merges & Nelson, *supra* note 70.

138. *See supra* text accompanying notes 87–92.

offering for sale, selling or importing the claimed invention.[139] The courts are powerless to offer the patent holder anything but protection from infringing competitors. Perhaps offering a government subsidy to pioneer inventions would benefit society more than offering expanded protection, but such a proposal is unrealistic. Within the historical limits of the patent system, some form of expanded protection is the only incentive available.

While expanded protection may be the only available incentive, it need not be limited to a more liberal finding of infringement under the doctrine of equivalents. An alternative way to boost protection is to increase the penalties for infringement while still relying on the standard infringement analysis. This would increase the value of pioneer patents, not only by increasing the judgments that result from successful infringement suits, but also by discouraging competitors from using infringing technology and risking the increased penalties. An incentive system based on increased damages would have two main advantages. First, it would promote efficiency by only requiring courts to determine whether an invention qualifies as a pioneer after a finding is made on infringement. The task of determining infringement would never be complicated unnecessarily. Second, and more importantly, such a system would preserve the predictability of the current doctrine of equivalents analysis by retaining the same patent scope that would otherwise apply.

At first glance, one might argue that increasing damages to reward pioneer inventions would discourage investment in new technical areas just as much as using an expanded range of equivalents. Both systems provide added value for the holder of the pioneer patent at the expense of competitors, but the practical effects of the two systems are very different. One of the key differences lies in which competitors are penalized. The expanded range of equivalents exacts an additional toll on competitive efforts that fall outside the standard range of equivalents. On the other hand, an increased damages approach would exact an additional toll only on competitive efforts that fall within the standard definition of infringement. Thus, with a system of increased damages, competitors have greater latitude to pursue opportunities in the field of the pioneer invention without incurring a penalty, i.e., a greater range of improvements and tangential technologies are permissible.

There is a fine line between an infringement and a legitimate design around. Courts generally agree that infringement must be curtailed,[140] but design arounds should be encouraged.[141] The key to achieving both of these goals is the promotion of predictability within the system, not the promotion of rules that encourage competitors to test the limits of patent scope. If the current reward system for pioneer patents based on an expanded range of equivalents were widely applied, it would dramatically reduce the predictability of the system. In contrast, a system based on increased damages would maintain the predictability of the

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139. 35 U.S.C. § 154 (2001).

140. *See generally* Graver Tank & Mfg. Co., v. Linde Air Prods. Co., 339 U.S. 607 (1950).

141. WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1355 (Fed. Cir. 1999).

standard infringement analysis. While it is true that the standard analysis is not completely predictable,[142] its contours are well established and will continue to develop within the case law. If the standard analysis is applied to pioneer inventions, competitors will be more certain about the scope of these patents, which will guide them in deciding whether it is necessary to obtain a license.

Even though the increased damages approach would improve predictability, some might argue that the mere potential for increased damages would offset this benefit by discouraging investment in technologies related to pioneer patents. Investors, of course, must consider liability when assessing an investment opportunity, but it is only a substantial factor in situations where a competitor seeks to test the limits of the patent scope. Increasing damages for the infringement of pioneer patents will only encourage competitors to act more prudently. Some competitors might be more reluctant to attempt a design around when the stakes are higher, but they would likely abandon only the most dubious efforts. Competitors could still take comfort in knowing that the basic infringement analysis for pioneer inventions would be the same as that for other inventions. With a highly predictable system, competitors can be relatively certain as to whether their design arounds are effective at avoiding a patent's claims.

Forcing competitors to take infringement liability for pioneer patents more seriously may actually benefit the patent system. The baseline measure of damages for infringement is reasonable royalty.[143] With such a measure, competitors may sometimes have little to lose by practicing a potentially infringing invention and then waiting for the patent holder to bring an infringement action.[144] However, competitors that face increased damages are more likely to take the initiative and determine the limits of a patent before engaging in any potentially infringing activity. In most cases, a competitor can allay a great deal of fear about incurring increased damages simply by obtaining a clear non-infringement opinion from a patent attorney. This effort adds some cost to an investment in a technology related to the pioneer patent, but this cost is not a significant obstacle to the development of that technology.

B. Applying Increased Damages to Pioneer Inventions

Increased damages have been a part of the patent system since the enactment of the Patent Act of 1793.[145] The current patent statute authorizes trial courts to "increase the damages up to three times the amount found or assessed" for patent infringement.[146] Case law, however, has limited this broad authority. The Federal Circuit has held that "enhanced damages may be awarded only as a penalty for an infringer's increased culpability, namely willful infringement or bad

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142. *See* Kurt L. Glitzenstein, *A Normative and Positive Analysis of the Scope of the Doctrine of Equivalents*, 7 HARV. J.L. & TECH. 281, 332 (1994).

143. CHISUM, *supra* note 5, § 20.03.

144. *See* Laura B. Pincus, *The Computation of Damages in Patent Infringement Actions*, 5 HARV. J.L. & TECH. 95, 124 (1991).

145. CHISUM, *supra* note 5, § 20.02.

146. 35 U.S.C. § 284 (2001).

faith."[147] Increased damages are thus currently limited to punitive applications, but some cases have recognized that increased damages may also serve a compensatory function.[148] However, in order to increase damages to reward pioneer inventions, this form of incentive has to be accepted more generally.

Increasing damages as an incentive must be completely separate from the current punitive system. Punitive applications of increased damages are strictly limited so as to prevent inequities.[149] For instance, some courts have held that a competitor cannot be held liable for increased damages if the competitor had no knowledge of the patent or makes a good faith challenge to the patent's validity.[150] These equitable defenses limit the imposition of increased damages to a tiny fraction of infringement cases.[151] The use of increased damages must expand if it is to serve as an effective incentive. Rather than having a complex list of equitable defenses, it makes sense to impose a uniform increase in damages on all infringers of pioneer patents. This system would operate like a tax on infringers. Since the increase applies to all infringers, it can be relatively modest and still serve as an effective incentive to holders of pioneer patents.

The main argument against the application of increased damages to all infringers of pioneer patents is that such a system would lead to inequitable results. Perhaps the most sympathetic infringers are those with no knowledge of the pioneer patent. It seems unjust to include infringers who developed their invention independently and did not know that they were risking infringement. Thankfully, such a scenario is unlikely where a genuine pioneer patent is at issue. First, pioneer patents achieve their status by distinguishing themselves from all existing technologies.[152] If two inventors create the same invention at the same time, they probably relied on a scientific development or other precursor in the prior art. Such a strong influence from the prior art would foreclose both inventions from pioneer status. Second, pioneer patents tend to be well known in the scientific community and competitors are more likely to know that they are risking infringement. Finally, with no equitable defense for lack of knowledge, competitors would have a strong incentive to stay current on new patents issued in their field. Those who are sophisticated enough to mount a damaging infringement should also be sophisticated enough to research their infringement liability before proceeding.

In assessing the fairness of a uniform application of increased damages to all infringers of pioneer patents, it is also important to consider that the penalties enacted by such a system would still vary dramatically according to the impact of the infringing process or device. In a standard patent litigation, the damages for

147. Beatrice Foods Co. v. New England Printing & Lithographing Co., 923 F.2d 1576, 1579 (Fed. Cir. 1991).

148. *See, e.g.*, SRI Int'l, Inc. v. Advanced Tech. Laboratories, Inc., 127 F.3d 1462, 1468 (Fed. Cir. 1997) ("When willful infringement or bad faith has been found, the remedy of enhancement of damages not only serves its primary punitive/deterrent role, but in so doing it has the secondary benefit of quantifying the equities as between patentee and infringer.").

149. *See* CHISUM, *supra* note 5, § 20.03[4][b].

150. *See* Eltra Corp. v. Basic Inc., 599 F.2d 745, 757–58 (6th Cir. 1979).

151. *See* Am. Safety Table Co. v. Schreiber, 415 F.2d 373, 378 (2d Cir. 1969).

152. *Supra* Part V.C.1.

infringement can be measured by either lost profits, established royalty, or reasonable royalty.[153] These methods are all based on the impact of the infringing invention. The proposed increased penalty for infringement of a pioneer patent is calculated as a percentage of the actual damages according to one of these three methods. This proportionality ensures that infringers who have the most substantial impact on the patent holder also face the most substantial penalties.

The final step in developing this proposed system of increased damages is to settle on the proper amount for the increase. The penalty for infringing a pioneer patent should be high enough to serve as an effective incentive to future inventors but low enough to avoid unfair treatment of competitors. Under the current system of imposing increased damages for punitive purposes, the amount of the increase, up to the statutory limit of treble damage, varies widely and is left to the discretion of the court.[154] For the purpose of providing incentive to the inventors of pioneer patents, a modest increase of twenty-five to fifty percent is reasonable. When applied to all infringers, this amounts to a sizable incentive.

C. A Definitive Approach

The proposed added protection for pioneer inventions is extremely easy to apply. In an infringement action involving a potential pioneer invention, the accused device will first be compared with the patented invention under a traditional infringement analysis. If the doctrine of equivalents is invoked, the range of equivalents will be exactly the same as it would be for a normal invention. If the accused device is established to be infringing, the court will then assess whether the patent qualifies as a pioneer. If it does qualify, the pioneer patent holder will be entitled to collect damages under one of the established methods of computation plus an increase of twenty-five to fifty percent. No equitable defenses will be available to avoid the imposition of this penalty and punitive penalties will be treated separately.

VII. CONCLUSION

In a perfect patent system, every invention would be rewarded with protection commensurate with its contribution to society. Early patent infringement cases worked toward this goal by looking to the merits of patented inventions and adjusting the application of the doctrine of equivalents to more vigorously protect the more worthy inventions.[155] However, this approach was vague and failed to become a substantial part of the modern infringement analysis.[156] Instead, modern courts look to more predictable approaches to finding infringement, especially those guided by analytical tests.[157]

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153. CHISUM, *supra* note 5, § 20.03.

154. *See* Smithkline Diagnostics, Inc. v. Helena Lab. Corp., 926 F.2d 1161, 1164 (Fed. Cir. 1991).

155. *See* CHISUM, *supra* note 5.

156. *See supra* text accompanying notes 80–81.

157. *See supra* text accompanying notes 77–79.

Even though an evaluation of the merits of patented inventions has been all but removed from the modern infringement analysis, the fundamental reasons for engaging in such an evaluation remain as strong as ever. It is wise to provide extra incentives for the development of pioneer inventions. These inventions are responsible for a disproportionate share of technical advancement, when compared to ordinary inventions.[158] Unfortunately, such inventions also experience disproportionately more challenges in obtaining fair protection within the patent system.[159] The uncertainty that exists in new technical fields and the heightened competitive attacks experienced by pioneer inventions erode the protections of the system and can allow pioneer inventors to lose control of the markets that they make possible.[160]

This Note proposes an approach to rewarding pioneer inventions without sacrificing predictability. The proposed approach accomplishes this by working within the modern infringement analysis as a supplement to the standard incentive system. It is designed to be easily applicable, while still respectful of the goals that make the pioneer invention doctrine worthwhile.

It is time for courts to look carefully at the reasons for abandoning the pioneer invention doctrine, which factored so heavily in early case law. If it was abandoned because it was too vague or otherwise unworkable within the modern analysis, this Note has hopefully demonstrated a viable alternative approach. Ultimately, it is up to the Supreme Court to clear up the confusion regarding the continued significance of pioneer status. Failing to update the pioneer invention doctrine only ensures that its goals will go unfulfilled, whereas adopting a renewed approach to the doctrine could bring the patent system closer to achieving its full potential.

158. *See* Oddi, *supra* note 67.
159. *See supra* text accompanying notes 65–66, 69.
160. *See supra* text accompanying note 69.