

1996

Doctrine of Equivalents After Hilton Davis: A Comparative Law Analysis

Toshiko Takenaka

University of Washington School of Law

Follow this and additional works at: <https://digitalcommons.law.uw.edu/faculty-articles>

 Part of the [Comparative and Foreign Law Commons](#), and the [Intellectual Property Law Commons](#)

Recommended Citation

Toshiko Takenaka, *Doctrine of Equivalents After Hilton Davis: A Comparative Law Analysis*, 22 RUTGERS COMPUTER & TECH. L.J. 479 (1996), <https://digitalcommons.law.uw.edu/faculty-articles/344>

This Article is brought to you for free and open access by the Faculty Publications at UW Law Digital Commons. It has been accepted for inclusion in Articles by an authorized administrator of UW Law Digital Commons. For more information, please contact cnyberg@uw.edu.

DOCTRINE OF EQUIVALENTS AFTER *HILTON
DAVIS*: A COMPARATIVE LAW ANALYSIS

TOSHIKO TAKENAKA*

I.	Introduction	480
II.	<i>Hilton Davis Chemical Co. v. Warner-Jenkinson Co.</i>	483
	A. Background	483
	B. The Three Questions Posed by the Court	484
	C. The Court's Disposition	488
III.	Analysis	490
	A. Advantages of the "Substantial Difference" Test	490
	1. The <i>Hilton Davis</i> Test for Infringement Under the Doctrine of Equivalents and Its Relationship to the German and Japanese Tests	490
	2. <i>Hilton Davis</i> Merged the Test for Infringe- ment Under the Doctrine of Equivalents with the Non-Obviousness Test	495
	3. <i>Hilton Davis</i> Increased the Legal Certainty of the Test for Infringement Under the Doctrine of Equivalents	497
	4. Future Problems	500

* Toshiko Takenaka is a Research Assistant Professor and an Assistant Director at the University of Washington School of Law's Center for Advanced Study and Research on Intellectual Property (CASRIP). She received an LL.B. from Seikei University in 1981, an LL.M. from the University of Washington School of Law in 1992, and a Ph.D. from the University of Washington in 1992 as well. She would like to thank Professor Donald S. Chisum, Professor of Law and Director of CASRIP at the University of Washington School of Law, for his invaluable comments and Ms. Andrea Geiger for editing and proofreading her manuscripts. The opinions expressed herein are solely those of the author and, consequently, should not be attributed to any organization with which the author is affiliated or any clients that the author represents.

B.	Advantages of In-Principle Application of the Doctrine of Equivalents	501
1.	Returning to In-Principle Application of the Doctrine of Equivalents	501
2.	Limiting the Application of Prosecution History Estoppel	509
C.	The Substantial Difference Test Should Be Decided by Judges	513
IV.	Proposal: Dynamic Invention Scope Theory	516
V.	Conclusion	519

I. INTRODUCTION

In *Graver Tank & Manufacturing Co. v. Linde Air Products*,¹ the Supreme Court noted that restricting the enforcement of patent rights to only those cases where the patent was literally infringed “would place the inventor at the mercy of verbalism and would be subordinating substance to form.”² To avoid this unjust result, the Court applied the doctrine of equivalents to find infringement where the differences between the claimed and the accused products or processes were insubstantial.³

Infringement under the doctrine of equivalents, however, has been often criticized for introducing an element of uncertainty in determining whether infringement has occurred. The Federal Circuit responded to these criticisms in *Hilton Davis Chemical Co. v. Warner-Jenkinson Co.*⁴ The court affirmed en banc a jury finding of infringement under the doctrine of equivalents, and attempted to resolve the ongoing debate concerning the legitimacy of the broad application of that doctrine.⁵ Because these issues were important to both industry and patent law practitioners, the court invited members of these groups⁶ to submit briefs regarding

1. 339 U.S. 605 (1950).

2. *Id.* at 607.

3. *Id.* at 610.

4. 62 F.3d 1512 (Fed. Cir. 1995) (per curiam), *cert. granted*, 116 S. Ct. 1014 (1996).

5. *Id.* at 1515.

6. The American Intellectual Property Law Association, Stanley L. Amberg, Acuson Corp., the Federal Circuit Bar Association, the American Bar Association, the Iowa State Bar Association, the California Association for the Advancement

whether a judge or a jury should determine infringement under the doctrine of equivalents and then how that judge or jury should apply the doctrine.⁷ The complexity of the issues and the significance of the answers to these questions were evidenced by the panel's seven-to-five split and by the lengths of the thoughtful concurring and dissenting opinions.⁸ On February 26, 1996, the United States Supreme Court granted certiorari to address the divergent opinions.⁹

Contrary to the patent community's expectations that the court would limit the application of the doctrine of equivalents, the Federal Circuit directed a return to a body of case law which favored patentees.¹⁰ Although the court asserted that its holding merely restated the test for infringement under the doctrine of equivalents,¹¹ the impact of its decision will likely be enormous. The ruling will generate significant criticism because it further increases the inherent uncertainty of the application of the doctrine of equivalents. The *Hilton Davis* decision, however, is probably welcome to those who practice law in nations such as Germany and Japan because it further aligns patent practice in the United

of Technology and Invention, the Houston Intellectual Property Law Association, and the Intellectual Property Law Institute filed amicus curiae briefs. *Id.* at 1514.

7. Specifically, the court asked the parties to brief the following questions:

1. Does a finding of infringement under the doctrine of equivalents require anything in addition to proof of the facts that there are the same or substantially the same (a) function, (b) way, and (c) result, the so-called triple identity test of *Graver Tank* . . . ? If yes, what?

2. Is the issue of infringement under the doctrine of equivalents an equitable remedy to be decided by the court, or is it, like literal infringement, an issue of fact to be submitted to the jury in a jury case?

3. Is application of the doctrine of equivalents by the trial court to find infringement of the patentee's right to exclude, when there is no literal infringement of the claim, discretionary in accordance with the circumstances of the case?

Id. at 1516.

8. *Id.* at 1529, 1536, 1545, 1550 (Newman, J., concurring; Plager, J., dissenting; Lourie, J., dissenting; Nies, J., dissenting, respectively).

9. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 116 S. Ct. 1014 (1996).

10. *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512 (Fed. Cir. 1995) (per curiam), *cert. granted*, 116 S. Ct. 1014 (1996).

11. *Id.* at 1516.

States with the patent practice of those nations.¹²

This Article will address a number of major topics. First, it discusses the Federal Circuit's renewed interest in *Graver Tank*¹³ and the merger of the infringement test with the patentability test established by the Supreme Court in *Graham v. John Deere Co.*¹⁴ Then, this Article responds to the dissenting judges in *Hilton Davis* who emphasized the danger of uncertainty that stems from the in-principle application of the doctrine of equivalents. This response explains that the application of the doctrine does not increase the uncertainty in determining infringement but, rather, encourages clear, definitive claim drafting. It then examines the relationship between the uncertainty in determining infringement and the patent laws of foreign jurisdictions, and it demonstrates that the application of the doctrine proffered by the *Hilton Davis* majority will increase the legal certainty of infringement determinations.

This Article also contends that the test for infringement under the doctrine of equivalents should parallel the standard for non-obviousness. Whether there is a substantial difference between a claimed invention and an accused device or process is a question of law to be determined by judges on the basis of a jury's factual findings.¹⁵ To enable juries to make reasonable decisions, more detailed jury instructions than those given in *Hilton Davis* are necessary.¹⁶ In conclusion, this Article proposes a method for restructuring U.S. patent claim interpretation theory under a central claiming principle.

The issues and the rules of law are complex. In part, this complexity can be attributed to courts' inconsistent dealings with the intricacies of the doctrine of equivalents. The *Hilton Davis*

12. See *infra* part III.A.1.

13. 339 U.S. 605 (1950).

14. 383 U.S. 1 (1966).

15. *Hilton Davis*, 62 F.3d at 1521-22.

16. The parties to a patent suit have a Constitutional right to have a jury determine the validity of the patent in question. *In re Lockwood*, 50 F.3d 966, 972, 976 (Fed. Cir.), cert. granted sub nom., American Airlines, Inc. v. Lockwood, 115 S. Ct. 2274 (1995); see *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 981-82 (Fed. Cir. 1995) (stating that the trial court must always instruct the jury about the detailed meaning of the patent claim), *aff'd*, 116 S. Ct. 1384 (1996).

majority's approach valuably solidifies the legal doctrine, but its reasoning is not flawless. A clear understanding of the majority's analysis therefore begins with the facts of the case.

II. *HILTON DAVIS CHEMICAL CO. V. WARNER-JENKINSON CO.*

A. *Background*

Both the plaintiff, Hilton Davis, and the defendant, Warner-Jenkinson, are dye manufacturers. In 1986, both parties simultaneously began projects to develop a process which would allow each of them to manufacture FD&C (food, drug, and cosmetic) Red Dye #40 and Yellow Dye #6 without using an expensive "salting out" step to remove impurities from the dyes.¹⁷ Hilton Davis developed the process first by using "ultrafiltration" as the alternative to the "salting out" process.¹⁸ Warner-Jenkinson then developed its accused ultrafiltration process without knowing about the patent that was issued to Hilton Davis for its filtration process.¹⁹ Warner-Jenkinson began to use its process to produce Red Dye #40 and was sued for patent infringement by Hilton Davis.²⁰

Language central to the outcome of this suit is located in the Hilton Davis patent that avers that the ultrafiltration process be operated "at a pH from approximately 6.0 to 9.0."²¹ Because the evidence revealed that the Warner-Jenkinson process operated at a pH of five, it was clear that there was not a literal infringement of the Hilton Davis patent.²² The parties nevertheless disputed the validity of the Hilton Davis patent and whether it had ever been infringed by the Warner-Jenkinson process under the doctrine of equivalents. The jury found that the Hilton Davis patent was valid and was subsequently infringed by Warner-Jenkinson, but also

17. *Hilton Davis*, 62 F.3d at 1515.

18. *Id.*

19. *Id.*

20. *Id.*

21. *Id.* This language was not initially included in the claims submitted with the patent application, but was added during patent prosecution to distinguish the Hilton Davis process from another patent's ultrafiltration process that operated at a pH above nine and preferably between 11 and 13. *Id.* at 1516.

22. *Id.*

noted that Warner-Jenkinson did not willfully infringe the Hilton Davis patent.²³ The trial court denied Warner-Jenkinson's post-trial motion and entered a permanent injunction prohibiting Warner-Jenkinson from utilizing an ultrafiltration process unless it did so at a pressure over 500 p.s.i.g. and a pH above 9.01.²⁴

Although Warner-Jenkinson appealed both the validity and the infringement findings, the Federal Circuit accepted only the infringement issue for a hearing en banc.²⁵ Warner-Jenkinson urged the court to find the trial court's application of the doctrine of equivalents to be improper.²⁶ Warner-Jenkinson contended that because it had independently developed the accused process, there was no equitable basis to introduce the application of the doctrine of equivalents in this particular case.²⁷ Warner-Jenkinson's argument was based on a popular view among legal scholars and practitioners alike that limited the scope of the doctrine of equivalents by reducing its application for equitable considerations.²⁸ This approach has produced inconsistencies in the case law that developed from different panels of the Federal Circuit. The court therefore took this opportunity to resolve the ongoing uncertainty surrounding the doctrine of equivalents and to proffer a solution to resolve its inconsistent application.

B. *The Three Questions Posed by the Court*

The Federal Circuit identified three questions for the parties to brief: (1) whether a finding of infringement under the doctrine of

23. *Id.*

24. *Id.*

25. *Id.* The three judge panel which initially heard the appeal decided the validity issue of the patent. *Id.* at 1515 n.1. A separate panel opinion addresses that issue. *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 64 F.3d 675 (Fed. Cir. 1995); see *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, No. 93-1088, 1995 WL 496748 (Fed. Cir. Aug. 8, 1995) (per curiam).

26. *Hilton Davis*, 62 F.3d at 1516.

27. *Id.*

28. See generally Donald Chisum & William Alsup, Brief for Amicus Curiae Urging Reversal of Judgement Under Review, *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512 (Fed. Cir. 1995) (No. 93-1088) (proposing that the doctrine should not apply when there is not any intentional copying), *cert. granted*, 116 S. Ct. 1014 (1996).

equivalents requires anything other than a showing of the same or substantially similar function, way, and result between the claimed and the accused inventions; (2) whether the issue of infringement under the doctrine of equivalents is an equitable remedy that should be decided by a judge or is an issue of fact that should be submitted to a jury; and (3) whether the doctrine of equivalents is to be decided at the judge's discretion depending on the circumstances of the case.²⁹

The first question relates to the test for deciding equivalency itself. The Federal Circuit asked whether the so-called "triple identity test" which requires substantial similarity of function, way, and result between the claimed and accused products or processes, assessed according to an objective standard, is adequate, and whether it should be the only test for infringement under the doctrine of equivalents.³⁰ Many courts, including the Federal Circuit, have viewed the triple identity test as the only test that was required by the leading United States Supreme Court case, *Graver Tank & Manufacturing Co. v. Linde Air Products*.³¹ This test, however, has been criticized for not providing a sensible mechanism to determine the scope of a patent.³²

In an earlier Federal Circuit case, Judge Nies, who wrote a dissenting opinion in *Hilton Davis*, sought to increase legal certainty in the application of the doctrine of equivalents by using other factors that the Court in *Graver Tank* considered to limit the doctrine's scope.³³ Judge Nies opined that the doctrine should not be applied unless there was an equitable basis to do so.³⁴ An amicus curiae brief urging the adoption of a non-copying/independent development distinction factor to prevent unneces-

29. *Hilton Davis*, 62 F.3d at 1516.

30. *Id.* at 1518.

31. 339 U.S. 605, 608 (1950).

32. *Malta v. Schulmerich Carillons, Inc.*, 952 F.2d 1320, 1324 (Fed. Cir. 1991) (stating that the jury is "put to sea without guiding charts when called upon to determine infringement under the doctrine"), *cert. denied*, 504 U.S. 974 (1992).

33. *International Visual Corp. v. Crown Metal Mfg. Co.*, 991 F.2d 768 (Fed. Cir. 1993).

34. *Id.* at 774.

sary application of the doctrine advocated a similar position.³⁵ This alternative viewpoint resulted from the failure of the Supreme Court in *Graver Tank* to indicate clearly whether the three-part test was the exclusive test for deciding equivalency, as well as from the lower courts' subsequent use of the three-part test as the primary test.³⁶

Although all the Federal Circuit judges agreed that the three-part test is inadequate, the majority in *Hilton Davis* surprised the patent-using community by rejecting recent case developments that limited application of the doctrine according to equitable considerations.³⁷ The court held that although the doctrine was founded on equitable fairness, the ultimate issue must be submitted to the trier-of-fact and is not a matter of the court's equitable discretion.³⁸ The majority also replaced the three-part test with a substantial difference test.³⁹ This test considers the identity of function, way, and result, as well as other objective evidence, in determining whether a substantial difference exists between a claimed and an accused product or process.⁴⁰ If the differences were deemed insubstantial, then the doctrine would apply.⁴¹

In *Hilton Davis*, the majority did not consider any subjective evidence (such as the defendant's lack of knowledge of the existence of the plaintiff's patent) to determine whether there was an infringement under the doctrine of equivalents.⁴² Because this analysis did not emphasize the equitable nature of the doctrine, a number of judges on the panel objected to the court's outcome by

35. Donald Chisum & William Alsup, Brief for Amicus Curiae Urging Reversal of Judgment Under Review at 13-15, *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512 (Fed. Cir. 1995) (No. 93-1088), cert. granted, 116 S. Ct. 1014 (1996).

36. See TOSHIKO TAKENAKA, INTERPRETING PATENT CLAIMS: THE UNITED STATES, GERMANY AND JAPAN 113-34 (17 IIC Studies—Studies in Industrial Property and Copyright Law 1995).

37. *Hilton Davis*, 62 F.3d at 1521.

38. *Id.* at 1521-22.

39. *Id.* at 1519-20.

40. *Id.* at 1521-22.

41. *Id.* (i.e., substantial differences would bar application of the doctrine).

42. *Id.* at 1520.

filing dissents⁴³ and citing recent case developments.⁴⁴ In her dissent, Judge Nies took the strongest position and objected to any application of the doctrine in this case.⁴⁵

The second and third questions posed by the court in *Hilton Davis* raised the question of whether infringement under the doctrine of equivalents is an equitable remedy.⁴⁶ The majority's and the dissenting judges' answers to this question highlight a fundamental disagreement between them. The majority views the doctrine as being part of the determination of a legal remedy.⁴⁷ The majority asserts that the Supreme Court's use of the terms "equitable" and "equity" indicates, in the broadest sense, "fairness," and is not used in the technical sense to invoke the body of equitable doctrine that originated in the Chancellor's Courts in England.⁴⁸ The majority's view, therefore, is that the doctrine must automatically be applied after finding that there is not a literal infringement, and the jury must decide the issue of infringement under the doctrine of equivalents.⁴⁹

All five dissenting judges agreed that the doctrine of equivalents is equitable in the sense that it originated from the courts of equity.⁵⁰ They argued that the doctrine should not be used unless there is an equitable basis for its application in a particular case, and that judges should have the exclusive authority to decide

43. *Id.* at 1536, 1545, 1550 (Plager, J.; Lourie, J.; Nies, J.; dissenting).

44. *E.g.*, *Charles Greiner & Co. v. Mari-Med Mfg., Inc.*, 962 F.2d 1031, 1036 (Fed. Cir. 1992) (stating that the doctrine of equivalents should be carefully confined to its equitable role in order to promote clarity and certainty); *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 935 (Fed. Cir. 1987) (averring that the doctrine of equivalents is designed to do equity and that a court may not disregard the structural and functional limitations of the language of a claim on which the public is entitled to rely to avoid infringement), *cert. denied*, 485 U.S. 961, and *cert. denied*, 485 U.S. 1009 (1988); *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1572 (Fed. Cir. 1986) (proffering that the doctrine of equivalents exists solely for equitable purposes).

45. *Id.* at 1579-81 (Nies, J., dissenting).

46. *Id.* at 1516.

47. *Id.* at 1521.

48. *Id.*

49. *Id.* at 1522.

50. *Id.* at 1525.

whether such a basis exists.⁵¹ Judge Nies further argued that both the majority's in-principle application of the doctrine to find an infringement and its holding that a patent inherently covers equivalents will completely change current claim drafting.⁵² Judge Nies also criticized the majority's historical analysis of the issue of whether a judge or jury should decide whether a patent has been infringed under the doctrine of equivalents.⁵³ She claimed that the majority's arguments were oversimplified and suggested that the Supreme Court should revisit the infringement issue because it has not been addressed since there were major revisions to the patent statute in 1952.⁵⁴ The Supreme Court has decided to consider the infringement issues set out in *Hilton Davis*.⁵⁵

C. *The Court's Disposition*

The Federal Circuit affirmed the jury's finding of infringement under the doctrine of equivalents.⁵⁶ The majority found the trial court's jury instructions to be sufficient even though the trial court stated that the jury "may" rely on the function-way-result test.⁵⁷ The satisfaction of the three-part test is often enough to prove infringement under the doctrine of equivalents.⁵⁸ The majority agreed with the trial court and rejected Warner-Jenkinson's equitable argument that the doctrine of equivalents should not be applied because the process was independently developed.⁵⁹ The majority stated that subjective evidence, such as knowledge of the

51. *E.g., id.* at 1540 (Plager, J., dissenting).

52. *Id.* at 1562 (Nies, J., dissenting).

53. *Id.* at 1579 (Nies, J., dissenting).

54. *Id.* at 1578-79 (Nies, J., dissenting).

55. Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 116 S. Ct. 1014 (1996); *Supreme Court Will Consider Standard For Patent Infringement By Equivalents*, BNA PAT., TRADEMARK, & COPYRIGHT L. DAILY, Feb. 28, 1996.

56. *Hilton Davis*, 62 F.3d at 1522.

57. *Id.* at 1523. The trial court phrased its jury instructions as follows: You may find infringement under the doctrine of equivalents when the accused process and the claimed invention perform substantially the same function in substantially the same way to yield substantially the same result even though the processes differ in name, form or shape.

Id.

58. *Id.*

59. *Id.*

existence of a patent, is irrelevant to showing substantial differences⁶⁰ and, thus, to deciding infringement under the doctrine of equivalents.⁶¹ The court reflected that even though the trial court could have further guided the jury by instructing it not to consider the independent development evidence when deciding the infringement issue, the trial court was nonetheless correct to direct the jury to base infringement on an assessment of the other evidence relevant to the substantiality of the differences when applying the function-way-result test.⁶² The court determined that the jury instructions were tailored to both the arguments and the evidence presented by the parties.⁶³

The court then reviewed the jury's finding of infringement under the doctrine of equivalents.⁶⁴ The court reviewed this finding under a "supported by substantial evidence" standard.⁶⁵ Under such a limited standard of review, the court was unable to consider independently evaluating the evidence presented.⁶⁶ The majority determined that there was sufficient and substantial evidence regarding the pH range, the membrane pressure, and pore size, to affirm the jury verdict.⁶⁷

The majority also rejected Warner-Jenkinson's request to apply prosecution history estoppel to prevent a finding of infringement.⁶⁸ Contrary to recent courts which have held that when claim language is altered during prosecution, the application of the doctrine of equivalents is estopped,⁶⁹ the majority declared that prosecution history estoppel only applies to the claim language that was altered to avoid prior art.⁷⁰ The majority found that although Hilton Davis had a literal claim between six and nine as a pH level, Hilton Davis had not surrendered a pH value lower than six

60. *Id.*

61. *Id.* at 1519.

62. *Id.* at 1523.

63. *Id.*

64. *Id.* at 1524.

65. *Id.*

66. *Id.*

67. *Id.*

68. *Id.* at 1525.

69. *E.g.*, *Wang Lab., Inc. v. Toshiba Corp.*, 993 F.2d 858 (Fed. Cir. 1993).

70. *Hilton Davis*, 62 F.3d at 1525.

because the patentee's (Hilton Davis') insertion of the lower limit was unnecessary to avoid prior art.⁷¹ Thus, the verdict of infringement under the doctrine of equivalents was proper despite the accused ultrafiltration process being operated at a pH level of five which is not within the literal scope of the patent.

III. ANALYSIS

A. Advantages of the "Substantial Difference" Test

1. *The Hilton Davis Test for Infringement Under the Doctrine of Equivalents and Its Relationship to the German and Japanese Tests*

The *Hilton Davis* majority's reasoning contradicts the fundamental principle that the claim language determines the patent's scope.⁷² The court failed to limit the patent because it did not adhere to the clearly stated limitation on the range of pH values. Some have strongly criticized the *Hilton Davis* majority because its holding increased the uncertainty in the test for infringement; they have averred that the court adopted an unclear and abstract "substantial difference" test because the term "substantial" is inherently flexible and uncertain.⁷³

In its opinion, the majority stated that its purpose was "to restate--not to revise" the test for infringement under the doctrine of equivalents.⁷⁴ The *Hilton Davis* majority, however, deleted the three-part test that had been uniformly applied by the Federal Circuit to determine infringement and replaced it with a new "substantial difference" test.⁷⁵ The majority also emphasized several objective tests which evaluate the difference between the

71. *Id.*

72. *E.g.*, *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 699 (Fed. Cir. 1983) (holding that the claim, and not the specification, determines the measure of the invention), *cert. denied*, 464 U.S. 1043 (1984).

73. *See, e.g.*, *Hilton Davis*, 62 F.3d at 1562 (Nies, J., dissenting) (claiming that the test for infringement was "made wholly arbitrary" by the majority).

74. *Id.* at 1516.

75. *See id.* at 1521-22 (explaining that in addition to the traditional function-way-result analysis used in the "substantial difference" test, the fact-finder should consider other factors such as copying and designing around).

claimed and accused inventions.⁷⁶ One such test is based on whether persons who are reasonably skilled in the art would have known of the interchangeability of an element in the patent and one not contained in the patent.⁷⁷

Infringement analysis under the doctrine of equivalents as set forth in *Hilton Davis* is similar to the central claim drafting principle in the German patent system.⁷⁸ The paradigm for this claim drafting principle is a system that emphasizes the protection of the technical idea embodied in the invention.⁷⁹ Patent claims under this system merely describe an example of the invention.⁸⁰ The central claim drafting principle provides that the courts should not be bound by the claim language selected by the patentee, but should be free to extend a patent's scope of protection to the accused embodiment which shares the same technical idea underlying the patented invention.⁸¹ U.S. courts followed this practice prior to 1950.⁸²

German and Japanese practitioners would also find the "substantial difference" test familiar to the extent that evaluation of the substantiality of any difference depends on consideration of both the three-part identity test⁸³ and the knowledge of interchangeability test.⁸⁴ For a long period of time, Germany had used this

76. *Id.* at 1525 (stating that "the substantiality of the differences between the claimed and accused products . . . is the ultimate question under the doctrine of equivalents").

77. *Id.* at 1519 (holding that an "'important factor' to be considered . . . 'is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was.'" (quoting *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 609 (1950))).

78. TAKENAKA, *supra* note 36, at 7. The central claiming system in Germany was modified to meet the requirements of the European Patent Convention. *Id.* at 36.

79. *Id.*

80. *Id.* at 26 (protecting the inventive idea or concept including what the inventor invented as well as minor modifications).

81. *Id.* at 8-9.

82. See *Hilton Davis*, 62 F.3d at 1578 (Nies, J., dissenting).

83. See *infra* note 107 and accompanying text (discussing the substantial difference test in *Graver Tank*, i.e., the three-part identity test).

84. See *infra* note 113 and accompanying text (discussing the knowledge of interchangeability test).

patentability standard to determine the scope of patent protection.⁸⁵ After the 1981 revision of Germany's patent law to meet the European Patent Convention Article 69 requirements,⁸⁶ the German Federal Supreme Court reaffirmed the test in *Formstein*.⁸⁷ The Court declared that an accused embodiment makes equivalent use of a patented invention if one skilled in the art, having taken into consideration the disclosures made in the patent and his or her general knowledge, would have conceived of replacing the disputed element of the accused embodiment with the corresponding element in the claimed invention to obtain the same result.⁸⁸

Although this test closely resembles the inventive step test,⁸⁹ the Court did not clearly state this similarity, and this ambiguous relationship between the inventive step and infringement under the doctrine of equivalents has caused a split in German case law. One German Supreme Court case indicated that patentability is relevant to finding infringement under the doctrine of equivalents,⁹⁰ while another found infringement under the doctrine despite the presence of a patent granted to the accused device.⁹¹ The most recent decision of the German Supreme Court finally eliminated this confusion and declared that the accused device cannot infringe a patent under the doctrine of equivalents if the patent office granted a patent to the accused device.⁹²

85. See TAKENAKA, *supra* note 36, at 26-36.

86. European Patent Convention, Oct. 5, 1973, art. 69 (entered into force Oct. 7, 1977), reprinted in INTERNATIONAL TREATIES ON INTELLECTUAL PROPERTY 143, 169-70 (Marshall A. Leaffer ed., 1990) [hereinafter European Patent Convention]. Article 69(1) provides: "The extent of the protection conferred by a European patent or a European patent application shall be determined by the terms of the claims. Nevertheless, the description and drawings shall be used to interpret the claims." *Id.* art. 69(1).

87. "Moulded Curbstone" (*Formstein*), 18 INT'L REV. INDUS. PROP. & COPYRIGHT L. 795, 798 (1987) (BGH).

88. *Id.*

89. "An invention shall be considered to be new if it does not form part of the state of the art." European Patent Convention, *supra* note 86, art. 54(1).

90. "Ion Analysis" (*Ionenanalyse*), 22 INT'L REV. INDUS. PROP. & COPYRIGHT L. 249, 255 (1991) (BGH 1988).

91. "Fixing Device II" (*Befestigungsvorrichtung II*), 23 INT'L REV. INDUS. PROP. & COPYRIGHT L. 111, 115-20 (1992) (BGH 1990).

92. "Segmentation Device for Tree Trunks" (*Zerlegvorrichtung für Baumstämme*), 26 INT'L REV. INDUS. PROP. & COPYRIGHT L. 261, 267 (1995) (BGH

Japanese courts and legal scholars have adopted the German infringement test interpreting it to consist of two components.⁹³ The first component evaluates the operation and result of an invention, and requires that the disputed element of the accused invention attain the same result as the corresponding element in the claimed invention.⁹⁴ This is called the "interchangeability," or "*chikan kanousei*," test.⁹⁵ The second component evaluates the structure of the invention and requires that one skilled in the art would have conceived of the interchangeability of the disputed element and claimed element.⁹⁶ This is called the "readiness of finding interchangeability," or "*chikan youisei*," test.⁹⁷ Japanese courts seldom find infringement when applying the doctrine of equivalents.⁹⁸ When they do apply the doctrine, they will find infringement only if there is an affirmative answer to both components of the aforementioned test.⁹⁹

While the Japanese test for infringement under the doctrine of equivalents resembles the inventive step test, the Japanese courts have never declared that they are the same. Some scholars and court decisions suggest that the substantial difference required to avoid infringement under the doctrine of equivalents is less than that for upholding the inventive step of the invention over the prior art.¹⁰⁰ These tests, however, are in fact the same because the

1994); Jochen Pagenberg, *More Refined Rules of Claim Interpretation in Germany--Are They Necessary?*, 26 INT'L REV. INDUS. PROP. & COPYRIGHT L. 228, 231, 232 (1995).

93. TAKENAKA, *supra* note 36, at 257 (citing KOSAKU YOSHIFUJI, TOKKYOHO GAISETSU (Outline of Patent Law) 381, 411 (8th ed. 1988)).

94. *Id.*

95. NOBUHIRO NAKAYAMA, CHUKAI TOKKYOHO 660 (2d ed. 1989). This test has also been referred to as the "substitution capability" test. TAKENAKA, *supra* note 36, at 257.

96. TAKENAKA, *supra* note 36, at 257 (citing KOSAKU YOSHIFUJI, TOKKYOHO GAISETSU (Outline of Patent Law) 381, 411 (8th ed. 1988)).

97. NAKAYAMA, *supra* note 95, at 660. The test has also been referred to as the obviousness test. TAKENAKA, *supra* note 36, at 257.

98. TAKENAKA, *supra* note 36, at 243.

99. Judgment of Sup. Ct., May 29, 1987, Juristo (No. 903) 85 (1988); Judgment of Tokyo High Ct., Feb. 3, 1994, 44 Tokkyo Kannri (No. 10) 1389 (1994).

100. NOBUHIRO NAKAYAMA, KOUGYOU SHOYUUKENN HO (Intellectual Property Law) 352 (1993).

same test was used to find either the presence or lack of an invention to uphold both infringement and patentability under the old patent law.¹⁰¹ In particular, under the old law,¹⁰² the Patent Office determined validity and infringement using the inventive step test.¹⁰³ To reflect these historical developments, the Japanese Patent Office used the term "equivalency" in its recently revised examination guidelines to indicate the test to find a substantially identical invention which anticipated the claimed invention.¹⁰⁴

A closer examination of the substantial difference test articulated in *Hilton Davis*, with its three-part sub-test, requiring identity in function, way, and result reveals that it is comparable to the Japanese courts' interchangeability test. Both tests evaluate an invention with respect to its operation. Similarly, the sub-test requiring knowledge of interchangeability by one skilled in the art is comparable to the readiness of interchangeability test. Thus, the *Hilton Davis* substantial difference test is closely aligned with the doctrine of equivalents tests in both Japanese and German courts, except that the former is applied at the date of infringement, while the latter is applied as of the patent's filing date. Although the U.S. government's withdrawal from negotiations indefinitely delayed the process of harmonizing the substantive aspects of Paris Union member states' patent laws,¹⁰⁵ the U.S. Federal Circuit significantly contributed to the harmonization of patent claim

101. *Id.*

102. *Tokkyoho* (Patent Law), Law No. 96 (1921) (Japan).

103. Unlike the current system where the courts have jurisdiction to decide infringement, prior practice required parties to bring infringement issues to the Japanese Patent Office which decided a patent's scope through a protection scope certification trial. See TAKENAKA, *supra* note 36, at 44.

104. KATSURA YOSHIMINE, SHINSA KIJUN NO KAISETSU (Explanations for Examination Standards) 122 (1984). The most recent revision of Japanese patentability standards, however, removed this equivalency test to clarify the distinction between novelty and the inventive step. JAPANESE PATENT OFFICE, EXAMINATION GUIDELINES FOR PATENT AND UTILITY MODEL IN JAPAN (1994).

105. Toshiko Takenaka, *Recent Developments on the WIPO Patent Harmonization Treaty Consultative Meeting*, CASRIP Newsletter (CASRIP, University of Washington School of Law), Spring 1995, at 9, 9.

interpretation by adopting the substantial difference test.¹⁰⁶

2. *Hilton Davis Merged the Test for Infringement Under the Doctrine of Equivalents with the Non-Obviousness Test*

The same question that has plagued both German and Japanese courts--whether the substantial difference test is the same as the test for finding non-obviousness--remains unanswered. The U.S. courts, like those in both Germany and Japan, formerly used one standard to decide both infringement and patentability.¹⁰⁷ Two standards were created when the lower courts interpreted *Graver Tank*¹⁰⁸ as using the three-part substantial difference test and *Graham v. John Deere Co.*¹⁰⁹ as using the non-obviousness test. Prior to *Graver Tank*, the Supreme Court often upheld an object's patentability, but denied its patent's infringement based on both a comparison of the accused patented device and the prior art, and the Court's reasoning that the two devices are separate and different inventions.¹¹⁰ The Supreme Court's usage of terms such as "the essence of invention" or "heart of invention" also suggests that the subject of the protection afforded at that time was the invention or concept, rather than the claim itself.¹¹¹ Because the

106. Japanese courts recently further harmonized their case law on claim interpretation with U.S. case law by adopting the test comparable to *Hilton's* "Substantial Difference" test and introducing *Hilton's* limitation on the application of prosecution history estoppel. See Toshiko Takenaka, *New Policy in Interpreting Japanese Patents*, CASRIP Newsletter (CASRIP, University of Washington School of Law), Spring/Summer 1996, at 1, 1.

107. See Toshiko Takenaka, *An Additional Test for the Doctrine of Equivalents? A Comparative Study Perspective on International Visual Corp. v. Crown Metal Manufacturing.*, in 1 INTERNATIONAL PERSPECTIVES ON THE LEGAL INTERPRETATION OF PATENT CLAIMS 102 (Donald S. Chisum et al. eds., 1995).

108. 167 F.2d 531 (7th Cir. 1948), *rev'd*, 339 U.S. 605 (1950).

109. 383 U.S. 1, 17 (1966) (holding that non-obviousness is a more practical test for patentability).

110. *Graver Tank*, 339 U.S. at 608-09; *cf.* *National Cash Register Co. v. Boston Cash Indicator & Recorder Co.*, 156 U.S. 502, 517 (1895) (holding that infringement was proven via the doctrine of equivalents).

111. See, e.g., *Hilton Davis*, 62 F.3d at 1563 (Nies, J., dissenting) (noting that historically the emphasis was not on specifying claims); Toshiko Takenaka, *Abhängige Erfindung und Reichweite des Patents*, in THEORIEN ZUM RECHT DES GEISTIGEN EIGENTUMS UND WETTBEWERBSRECHTS: FESTSCHRIFT ZUM 70. GEBURSTAG VON PROFESSOR FRIEDRICH-KARL BEIER 32 (1996); Toshiko

Hilton Davis majority returned to the *Graver Tank* standard, the substantial difference test is now the same as the test for patentability, i.e., the test for non-obviousness.

That the substantial difference test and the non-obviousness test are equivalent is further supported by the fact that the three-part test in *Graver Tank*, which was affirmed by the majority in *Hilton Davis*, is also the same as the sub-tests used for finding non-obviousness. The three-part test is parallel to the objective test for finding non-obviousness with respect to operational or functional features,¹¹² and the knowledge of interchangeability test is parallel to the objective test with respect to structural and methodological features.¹¹³ The test of whether the inventor copied the patented invention relies upon a secondary consideration of copying under the non-obviousness standard.¹¹⁴ In both the infringement and non-obviousness tests, copying is considered to the extent it indicates a substantial difference between two inventions.¹¹⁵ The *Hilton Davis* court rejected all evidence which was extraneous to the non-obviousness evaluation; this included where there was an intent to copy, whether the invention was a pioneer invention, and whether the accused product was a disclaimed embodiment.

By establishing the same threshold to grant a patent and to escape an infringement charge, the courts would require competitors to make an inventive effort to qualify for the designing around exception.¹¹⁶ This encourages innovation, rather than imitation, and therefore is consistent with fundamental patent policy to duly reward an inventor.¹¹⁷ If the substantiality of the difference required to find infringement were less than that to patent a product or process, patentees' continuing works may then lack protection. Such works would not be protected by the doctrine of equivalents

Takenaka, *Riyou Hatsumei to Tokkyo Hatsumei no Hogo Hann-i*, in CHITEKI ZAISAN TO KYOUSOU HO NO RIRON 123 (1996).

112. See 2 DONALD S. CHISUM, PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY AND INFRINGEMENT § 5.03[5][a] (1994).

113. See *id.*

114. See *id.*

115. See *supra* notes 107-14 (discussing the three-part tests for substantial difference and non-obviousness).

116. TAKENAKA, *supra* note 36, at 298.

117. *Id.*

when the difference from the underlying patented invention is substantial, but still not sufficient to qualify for a separate patent. Thus, the same standard must be adopted for both infringement and patentability to protect effectively all of the improvements resulting from continuous research and development projects and to encourage further improvements. Furthermore, if the substantial difference test were the same as the non-obviousness test, courts could enjoy the benefit of a rich body of case law established by the Federal Circuit regarding non-obviousness, rather than starting anew.

3. *Hilton Davis Increased the Legal Certainty of the Test for Infringement Under the Doctrine of Equivalents*

Another positive result of the decision in *Hilton Davis* is that there is less uncertainty in litigating infringement issues than there would have been had the dissent's view been adopted. The "uniform substantial difference" test¹¹⁸ and the "knowledge of interchangeability" sub-test¹¹⁹ adopted by the *Hilton Davis* majority provides more certainty in the determination of patent infringement than the multiple test. The three dissents proposed selecting from multiple tests, such as tests for copying or identifying pioneering inventions, as well as the two-pronged test, requiring interchangeability and readiness of interchangeability, to find infringement under the doctrine of equivalents.¹²⁰

Many problems would result from the introduction of multiple tests. For example, one could predict that there would be problems with the non-obviousness test that the dissent proposed because Japanese experience with a similar set of multiple tests has revealed that this will cause confusion. The Japanese courts have applied the doctrine of equivalents similar to the manner in which the *Hilton Davis* dissent has proposed they be applied.¹²¹ Thus, Japanese industry chooses not to recognize infringement under the

118. See *supra* part III.A.1.

119. See *supra* part III.A.1.

120. *Hilton Davis*, 62 F.3d at 1543-45, 1547-49, 1579.

121. *Id.* at 1536 (Plager, J., dissenting); *id.* at 1545 (Lourie, J., dissenting); *id.* at 1550 (Nies, J., dissenting).

doctrine of equivalents at all.¹²²

In *Hilton Davis*, the majority held that these sub-tests are to be used only to the extent necessary to ascertain the result of the primary test—the substantiality of the difference between the claimed and the accused inventions.¹²³ The adoption of the dissenting opinion's proposal would have moved U.S. patent claim interpretation closer to Japanese practice and would have been welcomed by Japanese practitioners.¹²⁴ The Federal Circuit, however, chose not to adopt this view and reached a more efficient conclusion by limiting a court's discretion to select a test and thereby preventing the uncertainty introduced by such discretion.

The majority also chose to reject applying these sub-tests which employ subjective factors, such as the defendant's knowledge of a patent, to prevent the uncertainty which would have otherwise existed. If the majority had agreed with the dissenters and found that knowledge of the patent's existence were relevant to finding infringement,¹²⁵ then patentees could not determine whether their patents had been infringed until discovery revealed the defendants' knowledge. A finding of infringement would depend on each party's knowledge of the patent's existence and would introduce a significant degree of uncertainty into any infringement case.

Furthermore, if a lack of knowledge of a patent's existence were to allow a party to escape the penalties associated with infringement, then competitors would be discouraged from fully investigating existing patents prior to making and selling their products. This would clearly undermine the fundamental policy of placing a duty on those in the industry to ascertain that which has been patented to prevent any form of patent infringement. It would also discourage the use of information that is disclosed in patent publications because such inspection could increase the possibility of learning about a previously patented product or process. Incorporating knowledge into an infringement case would frustrate

122. See TAKENAKA, *supra* note 36, at 67, 243.

123. *Hilton Davis*, 62 F.3d at 1512.

124. Toshiko Takenaka, *Beikoku Tokkyo Kureimu Kaishaku no Saikin no Doukou* (The Recent Development of the Patent Claim Interpretation in the United States), 17 CHIZAIKEN FORUM 2 (1994).

125. *Hilton Davis*, 62 F.3d at 1563 (Nies, J., dissenting).

the fundamental patent policy of disseminating technical information through the patent's disclosure so as to avoid double investment in the same technology. The current patent system still encourages one to design around a claim to avoid infringement.¹²⁶ Thus, by rejecting a test based on a subjective knowledge factor, the majority furthers not only the interest of preventing legal uncertainty, but also of adhering to basic patent policy.

The *Hilton Davis* majority correctly focused on the benefit of the sub-test based on the knowledge of one skilled in the art with respect to interchangeability. This sub-test will significantly increase the legal certainty in finding equivalency. The test evaluating solely the substantial identity of the function, way, and result is incomplete because it mainly focuses on the operational features of the invention and pays little attention to the structural features. The sub-test concerning the knowledge of interchangeability focuses the evaluation of the invention on its structural features as well as its operational features.

The test requiring knowledge of interchangeability is more objective and more sensible than the three-part test because it takes into account the state of the art and can reward the inventor based on the technical significance of the invention.¹²⁷ German courts and legal scholars have long recognized that an evaluation focusing on structural features provides a more objective test than one focusing on operational features.¹²⁸ These courts have replaced their method for examining the patentability of an invention with the non-obviousness test.¹²⁹ Current infringement practice in Germany also focuses more on the non-obviousness of the interchangeability than on function and result identity.¹³⁰ The benefit of this practice is well illustrated by the German courts' analysis

126. See DONALD S. CHISUM & MICHAEL A. JACOBS, UNDERSTANDING INTELLECTUAL PROPERTY LAW § 2F (1992) (describing the methods for determining patent infringement).

127. TAKENAKA, *supra* note 36, at 298-302.

128. *Id.* at 298-99.

129. *Id.*; see HANNS ULLRICH, STANDARDS OF PATENTABILITY FOR EUROPEAN INVENTIONS (1 IIC Studies—Studies in Industrial Property and Copyright Law 1977).

130. TAKENAKA, *supra* note 36, at 301-02.

of infringement under the doctrine of equivalents and its reliance on this objective evidence.¹³¹

Both scholars and courts in the United States are aware of the advantage of the test focusing on the non-obviousness of the interchangeability over the test focusing solely on the operation and result, and have selected the former as the primary standard to determine non-obviousness.¹³² The same courts and scholars, however, have neglected to select this test for the doctrine of equivalents. The *Hilton Davis* decision places more weight on the knowledge of interchangeability by one skilled in the art than on triple identity. This allows U.S. judges and juries to decide the substantiality of any differences in a more objective manner. Legal scholars have shown that they can reach the result of known interchangeability by relying on such objective factors as the patented invention itself, the prior art, evidence of developing trends in the particular field, and expert testimony.¹³³ Furthermore, as long as the scope of infringement is limited by the knowledge of one skilled in the art, legal certainty is better assured because competitors are alerted to known equivalents which fall within this scope. This certainty effectively precludes unpleasant surprises.

4. *Future Problems*

The majority's efforts to return to the doctrine of equivalents as articulated in *Graver Tank* is deficient because it fails to clearly state that the substantial difference test is the same as the non-obviousness test. The experience of German courts indicates that an unclear relationship between the test for infringement and the

131. For example, see *Improver Corp. & Sicommerce AG v. Remington Prods. Inc.*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 572 (1990) (OLG 1988). This case is analyzed in Takenaka, *supra* note 107, at 116-20. See Allan M. Soobert, *Analyzing Infringement by Equivalents: A Proposal to Focus the Scope of International Patent Protection*, 22 RUTGERS COMPUTER & TECH. L.J. 189, 211-14 (1996).

132. Edmund W. Kitch, *Graham v. John Deere Co.: New Standards for Patents*, in THE SUPREME COURT REVIEW 293 (1966) (analyzing the three possible tests for patentability and concluding that only the non-obviousness test survives after *Graham v. John Deere Co.*).

133. Takenaka, *supra* note 107, at 119.

test for patentability creates confusion.¹³⁴ This confusion has also arisen in U.S. courts. The U.S. courts may be uncertain as to whether they can use the case law developed under the test of non-obviousness to evaluate knowledge of interchangeability. The U.S. courts must only use case law predating the U.S. Supreme Court decision in *Graver Tank* to evaluate knowledge of interchangeability if the courts do not use the case law developed under the non-obviousness test when evaluating interchangeability.

One issue plaguing the German courts is whether a subsequently developed device or process infringes an earlier patent because infringement is decided by the one-skilled-in-the-art's knowledge of interchangeability at the time of infringement rather than at the time of the application date.¹³⁵ Knowledge of interchangeability at the time of filing is inconsequential to this finding.¹³⁶ The U.S. courts, however, may need to resolve whether infringement under the doctrine of equivalents should be affirmed, even if the exchangeability of the accused product was not known to one skilled in the art at the time of invention, but became known through expansion of knowledge by the time the product was manufactured. Not finding infringement of an invention at one time, but finding infringement for the same invention at another time is unreasonable. The U.S. courts will need to determine a way to avoid this unreasonable result.

B. *Advantages of In-Principle Application of the Doctrine of Equivalents*

1. *Returning to In-Principle Application of the Doctrine of Equivalents*

The *Hilton Davis* majority rejected the notion that judges have the discretion to apply the doctrine of equivalents depending on the presence of an equitable basis for its application in a particular case.¹³⁷ The court noted that once trial courts find that there is

134. Pagenberg, *supra* note 92, at 228-29.

135. *Id.*

136. *Id.*

137. *Hilton Davis*, 62 F.3d at 1521.

not a literal infringement of the patent, they must examine infringement under the doctrine of equivalents.¹³⁸ Each of the three dissents strongly opposed the majority's view that infringement under the doctrine originates in the common law.¹³⁹ In particular, Judge Nies argued that courts should not apply the doctrine of equivalents unless the invention is described in means-plus-function form.¹⁴⁰ She insisted that Congress' codification of § 112 ¶ 6,¹⁴¹ which extends claims to cover equivalents, should be interpreted to preclude application of the doctrine, unless the applicant adopts a means-plus-function format.¹⁴² She concluded that by affirming the in-principle application of the doctrine of equivalents, the majority opinion returned U.S. patent claim interpretation to the status that existed prior to the shift from the central claiming principle to the peripheral claiming principle.¹⁴³

The central claiming principle required that a court determine a patent's scope by defining the principle that formed the inventive idea or solution underlying the claim language.¹⁴⁴ In contrast, the peripheral claiming principle directed a court to determine the patent's scope by looking at the claim language; the courts' role was to clarify the language and apply it to the accused device or process.¹⁴⁵ Contrary to the basic impression that indicates a wide gap between these two methods, these two approaches to claim interpretation have become increasingly intertwined as statutes and

138. *Id.*

139. *Id.* at 1536-83.

140. *Id.* at 1559-60 (Nies, J., dissenting).

141. 35 U.S.C. § 112 (1994).

142. *Hilton Davis*, 62 F.3d at 1559 (Nies, J., dissenting).

143. *Id.* (Nies, J., dissenting). For a general discussion and overview of central and peripheral claiming principles and their historical developments, see TAKENAKA, *supra* note 36, at 6. Under the central claiming principle, the claim functions as an indication of the center point of the scope of protection and is expanded by the courts if the patent is litigated. *Id.* Under the peripheral claiming principle, the claim functions as an indication of the peripheral boundary of the patent scope. *Id.*

144. See TAKENAKA, *supra* note 36, at 3. ("Germany is the paradigm of a country that employs the central definition theory.")

145. *Id.* To patent professionals and scholars, the United States is the model country employing the peripheral claiming principle. *Id.*

practices related to claim function have changed and evolved.¹⁴⁶ They have also become more interconnected as claim interpretation doctrines have been judicially created.¹⁴⁷

The United States once employed the central claiming principle whereby the claim's significance increased as the examination system developed.¹⁴⁸ Because the earliest U.S. patent statutes did not require that the claim be included in the application, the claim was insignificant even after the practice of stating an invention was adopted by the patent community.¹⁴⁹ Once the 1836 Act¹⁵⁰ codified the judicially created duty to include the claim language, the U.S. patent system allowed use of claim language in the "substantially as herein described" format.¹⁵¹ After the 1836 Act was codified, the case law indicates that the claim merely identified an example of the invention created by the inventor.¹⁵²

The shift toward the peripheral claiming principle began at the end of last century and commenced with the striking of the "substantially as described" format from claim drafting practice.¹⁵³ The shift came in response to the refusal to extend the scope of protection to variations of claimed inventions.¹⁵⁴ Although the shift from the inventor's interest to the public's interest first became apparent in the 1930s and 1940s, the shift has never been fully completed because the Supreme Court did not reject such ambiguous expressions as in the means-plus-function format claims.¹⁵⁵ The return to the central claiming principle

146. *Id.*

147. *Id.*

148. *Hilton Davis*, 62 F.3d at 1563 (Nies, J., dissenting).

149. Warren T. Jessup, *The Doctrine of Equivalents*, 54 J. PAT. OFF. SOC'Y 248, 254 (1972).

150. Act of July 4, 1836, ch. 357, § 6, 5 Stat. 117.

151. Jessup, *supra* note 149, at 254.

152. See TAKENAKA, *supra* note 36, at 9 (citations omitted).

153. *Id.* at 11.

154. *Keystone Bridge Co. v. Phoenix Iron Co.*, 95 U.S. 274 (1877) (holding that the patent cannot cover variations or improvements upon the patented invention).

155. *Hilton Davis*, 62 F.3d at 1560 (Nies, J., dissenting). Despite public interest concerns about the use of ambiguous terms, the Patent Act of 1952 legitimized the means-plus-function format. Patent Law Act of 1952, ch. 950, 66 Stat. 798 (codified as amended at 35 U.S.C. § 112 (1994)).

became apparent when the Supreme Court endorsed infringement factors under the doctrine of equivalents in *Graver Tank*.¹⁵⁶ Although public interest concerns resurfaced in *Pennwalt Corp. v. Durand-Wayland, Inc.*¹⁵⁷ and sought to limit the doctrine, more recent decisions from the Federal Circuit indicate that the U.S. patent system prefers the central claiming principle over the peripheral claiming principle.¹⁵⁸

All three dissenting opinions in *Hilton Davis* urge either limiting or abolishing the use of infringement under the doctrine of equivalents because they espouse that the doctrine creates uncertainty in infringement results.¹⁵⁹ This argument, however, is not persuasive because it overstates the evils of uncertainty and fails to take into account the benefits of the doctrine.

First, limiting infringement to the literal patent scope does not remove the uncertainty of infringement results unless the court limits infringement to the embodiments described in the specification.¹⁶⁰ When an infringer produces a product which is not identical to one of the embodiments in the specification, courts must examine whether the disputed claim term includes the replacement or addition that was utilized by the infringer.¹⁶¹ This is well-illustrated in *Senmed, Inc. v. Richard-Allan Medical Industries*,¹⁶² where the parties vigorously disputed whether a simple term such as "on" included the relation of two elements in the accused device or excluded it with respect to a prior art device.¹⁶³

Japanese case law further illustrates this point. According to Japanese patent policy, legal certainty and competitors' interests in

156. 339 U.S. 605, 608 (1950).

157. 833 F.2d 931 (Fed. Cir. 1987), *cert. denied*, 485 U.S. 961, and *cert. denied*, 485 U.S. 1009 (1988).

158. *E.g.*, *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251 (Fed. Cir. 1989).

159. *Hilton Davis*, 62 F.3d at 1536-83.

160. See Clarence J. Fleming, *The Doctrine of Equivalents—Should It Be Available in the Absence of Copying?*, 76 J. PAT. & TRADEMARK OFF. SOC'Y 233, 238 (1994).

161. *Id.*

162. 888 F.2d 815 (Fed. Cir. 1989).

163. *Id.* at 817.

designing outweigh the inventors' interests in being rewarded for their inventions.¹⁶⁴ Japanese courts seldom use the doctrine of equivalents to find infringement,¹⁶⁵ but still cannot completely remove the uncertainty which results from evaluating whether the disputed claim term includes the undisclosed replacement or addition.¹⁶⁶ Removing the uncertainty would mean that a court's claim interpretation included only embodiments in the specification language regardless of how the claim is drafted because the embodiments are assumed to be included unless they are expressly disclosed or excluded.¹⁶⁷ This practice, however, contravenes the patent policy that encourages innovation by rewarding inventors. For this reason, U.S. industry has extensively criticized the Japanese practice.¹⁶⁸

Second, the doctrine of equivalents encourages including a clear and definite description of the invention.¹⁶⁹ When the requirement of explicit claim drafting is stringently enforced, applicants tend to use more abstract and indefinite words such as "substantially" and "approximately" to anticipate and include possible future variations.¹⁷⁰ If inclusion of obvious future modifications or variations of the patented invention is expected under the doctrine of equivalents, applicants are encouraged to use more definite terms to describe the inventions. One can readily expect that complete removal of the doctrine will lead to the adoption of the means-plus-function format in claim drafting, as well as the use of relative or functional terms such as "substantially" and "approximately."¹⁷¹

164. See Toshiko Takenaka, *The Role of the Japanese Patent System in Japanese Industry*, 13 UCLA PAC. BASIN L.J. 25, 25 (1994) (discussing the Japanese patent policy of not providing much protection for the invention while protecting the patent applicant's rights).

165. Andrew H. Thorson & John A. Fortkort, *Japan's Patent System: An Analysis of Patent Protection Under Japan's First-to-File System* (pt. II), 77 J. PAT. & TRADEMARK OFF. SOC'Y 291, 306 (1995).

166. *Id.* at 308.

167. TAKENAKA, *supra* note 36, at 209-10.

168. U.S. GEN. ACCOUNTING OFFICE, *INTELLECTUAL PROPERTY RIGHTS: U.S. COMPANIES' PATENT EXPERIENCES IN JAPAN* (1993).

169. RIDSDALE ELLIS, *PATENT CLAIMS* 10-12 (1949).

170. *See id.* at 4-6 (discussing the central claiming principle).

171. *See id.*

This would obscure even the point at which claim interpretation should begin.

Third, the dissenting judges, and particularly Judge Nies, failed to consider the need for a clearer process of determining infringement to incorporate the patent policy of encouraging innovation.¹⁷² By effectively punishing applicants who have failed to draft a claim clear enough to include the defendant's product, the dissenting judges assume that inventors should have been aware of all possible future modifications and should have drafted claims to include them. In practice, perfect claim drafting that covers all future modifications, while excluding all prior art, is impossible.¹⁷³

The impossibility of perfect claim drafting of all future modifications is particularly true in the case of pioneering inventions. When the innovation is sophisticated in relation to the existing state of art, an inventor can conceive of only a few modifications when applying that technology.¹⁷⁴ Consequently, it is very difficult to draft a claim to anticipate future modifications when the state of the art and the body of knowledge evolves through the contributions of other inventors.¹⁷⁵ Inventors of pioneer inventions may be able to draft broad claims because no prior art exists to prevent them from doing so.¹⁷⁶ They may, however, be penalized for failing to satisfy the enablement requirement because all possible embodiments covered in the claim are not disclosed sufficiently for those skilled in the art.¹⁷⁷ Alternatively, they may not be able to

172. *Graver Tank*, 339 U.S. at 607.

173. See generally Robert D. Katz & Steven E. Lee, *Advanced Claim Drafting and Amendment Writing for Chemical Inventions*, 426 PLI PATENTS, COPYRIGHTS, TRADEMARKS & LITERARY PROPERTY COURSE HANDBOOK SERIES 121 (1995) (discussing the difficulty of claim drafting).

174. See Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 854 (1990) (discussing the doctrine of equivalents and pioneer inventions).

175. See Katz & Lee, *supra* note 173 and accompanying text.

176. *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1362 (Fed. Cir. 1983).

177. *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991) (noting that some argue narrower claims would not provide real protection because the disclosure requirement enables any person skilled in the art to reconstruct the invention).

enjoy a broad scope of protection because the application of the reverse doctrine of equivalents may prevent enforcing the patent as broadly as drafted.¹⁷⁸ Rigid application of the enablement requirement and the removal of the doctrine of equivalents would result in an insufficient reward for pioneer inventions when compared to contributions made to the art.

A more practical view is suggested by Judge Rich in *Wilson Sporting Goods Co. v. David Geoffrey & Associates*:¹⁷⁹ the doctrine of equivalents does not change the claims, but rather expands the right to exclude equivalents of that which is claimed.¹⁸⁰ The central claiming principle is based on this view and does not require an inventor to draft a claim covering future modifications.¹⁸¹ The claim's role is to indicate the subject matter that is to be examined by the Patent Office to certify that the claimed invention is sufficiently distinct and patentable in relation to existing technology.¹⁸² It is not the Patent Office's role to evaluate the claimed invention with respect to future modifications and variations.¹⁸³ Instead, the courts reevaluate the claimed invention when a modification is created and then litigated for infringement.¹⁸⁴ Although the courts cannot invade the scope of protection determined by the Patent Office in light of the existing technology, the courts are free to interpret the scope on the basis of the claim with respect to future modifications, even if that interpretation goes beyond the scope that was granted by the Patent Office.¹⁸⁵ The central claiming principle employs the doctrine of equivalents to compensate for the impossibility of drafting a perfect claim; this doctrine allows inventors to expand the claim's scope to that which the inventor would have initially claimed if the inventor knew about the features of the defendants' products and

178. *Merges & Nelson*, *supra* note 174, at 862.

179. 904 F.2d 677 (Fed. Cir.), *cert. denied*, 498 U.S. 992 (1990).

180. *Id.* at 684.

181. Dietrich Reimer, *The Scope of Protection Provided by a Patent Under German Patent Law*, in *PATENT CLAIM DRAFTING AND INTERPRETATION* 143 (John A. Kemp et al. eds., 1983).

182. *Id.*

183. *Id.*

184. *Id.*

185. *Id.*

processes.¹⁸⁶

Unfortunately, Judge Rich's suggestion does not clarify the triangular relationship among the claimed invention, the accused embodiment, and the prior art.¹⁸⁷ The German scholar Bernhard Geissler suggested that the claimed invention and accused product must be nonobvious from the prior art to maintain the validity of the claimed invention, and the accused product must be obvious from the claimed invention.¹⁸⁸ Judge Rich failed to note that the reason for reading the claim to include obvious modifications is that no one but the inventor can claim a patent for them. If the accused product is obvious from the claimed invention, the defendant would never have been able to patent the product.¹⁸⁹ Such obvious modifications have never been in the public domain;¹⁹⁰ instead, they have always belonged to the inventors because it was their patented inventions that made obvious, to those skilled in the art, not only the claimed invention but also obvious variations.¹⁹¹ This also provides warnings about the variations to competitors because the variations are those that one would have conceived as being obvious from the publication of the claim, taking into account the disclosure in the specification and the general knowledge of one skilled in the art.¹⁹²

In short, the removal of infringement under the doctrine of equivalents would not significantly increase legal certainty and might even introduce uncertainty by encouraging indefinite claim drafting practice. Establishing an objective test for applying the doctrine, however, would increase legal certainty. As previously discussed, the test which corresponds to the non-obviousness test

186. *Wilson Sporting Goods*, 904 F.2d at 684-85.

187. *See generally Graver Tank*, 339 U.S. 605 (setting forth the "triple identity test").

188. Bernhard Geissler, *Comment on Formstein*, 18 INT'L REV. INDUS. PROP. & COPYRIGHT L. 802, 803-05 (1987).

189. *Graver Tank*, 339 U.S. at 608; *Wilson Sporting Goods*, 904 F.2d at 684-85.

190. *See* *Loctite Corp. v. Ultraseal, Ltd.*, 781 F.2d 861, 870 (Fed. Cir. 1985) (discussing what is included in the public domain).

191. *See Graver Tank*, 339 U.S. at 609 (discussing the important factors to be considered in determining equivalents).

192. *Id.*

is objective and encourages innovation.¹⁹³ Moreover, the U.S. courts could benefit from their own established case law regarding patentability and validity.

Even before *Hilton Davis*, the difference between the German central claiming principle and the United States "peripheral" claiming principle was minimal.¹⁹⁴ The U.S. courts' adherence to the peripheral claiming principle was reflected only in their strict application of the "all elements" rule in literal infringement¹⁹⁵ and in their reluctance to find infringement via the doctrine of equivalents determining that there was not a literal infringement of the patent. The majority's argument that it did not expand the literal scope, but found it substantially identical,¹⁹⁶ is artificial and unpersuasive. The United States should admit its adherence to the central claiming principle and restructure the theoretical foundation of claim drafting and interpretation by reexamining the relation between infringement and patentability.

2. *Limiting the Application of Prosecution History Estoppel*

The *Hilton Davis* majority properly rejected Warner-Jenkinson's request to apply prosecution history estoppel and correctly affirmed the finding that the process which operated below the claimed pH range was equivalent to the process operating at the claimed range.¹⁹⁷ The majority refused to apply this doctrine because the patentee's inclusion of the lower range limitation was unnecessary to distinguish it from the cited prior art.¹⁹⁸ The majority noted that estoppel applies only to the extent necessary to maintain the patentability of the claimed invention.¹⁹⁹ The limitation imposed by the majority is significant because it effectively merges the

193. See *supra* part III.B.1.

194. See ELLIS, *supra* note 169, at 3-4, 5-6 (discussing the evolution of the principles of central and peripheral claiming).

195. See *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 949-50 (Fed. Cir. 1987) (Nies, J., dissenting) (discussing the "all elements" rule), *cert. denied*, 485 U.S. 961, and *cert. denied*, 485 U.S. 1009 (1988).

196. *Hilton Davis*, 62 F.3d at 1524-25.

197. *Id.* at 1528.

198. *Id.* at 1525.

199. *Id.*

doctrine of prosecution history estoppel and the prior art limitation doctrine into one, thereby rendering their once separate existence to be meaningless.

The elimination of prosecution history estoppel will increase legal certainty. Application of prosecution history estoppel both increases uncertainty as well as frustrates the patent policy of disseminating technical information in contravention of the well-accepted belief that prosecution history estoppel limits the doctrine of equivalents and thus increases legal certainty.²⁰⁰ This is evident because both the nature and purpose of prosecution history estoppel are unclear.²⁰¹ This produces significant uncertainty in determining the applicable scope of the estoppel doctrine,²⁰² and has resulted in conflicting authority within the Federal Circuit.²⁰³

The more stringent viewpoint favors defendants and broadly applies prosecution history estoppel to remove any possibility of infringement under the doctrine of equivalents.²⁰⁴ Arguments and amendments give rise to estoppel regardless of whether they are necessary to overcome the prior art.²⁰⁵ This grants a party more opportunities to assert estoppel in order to bar the opposition's application of the doctrine of equivalents.²⁰⁶ Although arguments and amendments that clarify the claim language usually do not give

200. Kurt F. James, Comment, *Patent Claims and Prosecution History Estoppel in the Federal Circuit*, 53 MO. L. REV. 497 (1988).

201. See 4 CHISUM, *supra* note 112, § 18.05[3] (1991); see also Donald S. Chisum, Primer on Prosecution History Estoppel (Spring 1991) (unpublished manuscript, on file with the University of Washington School of Law).

202. TAKENAKA, *supra* note 36, at 134.

203. See 4 CHISUM, *supra* note 112, § 18.05 (1991).

204. See, e.g., *Prodyne Enters. v. Julie Pomerantz, Inc.*, 743 F.2d 1581, 1583 (Fed. Cir. 1984) (declining to speculate on the necessity of a claim limitation for overcoming prior art in determining the applicability of prosecution history estoppel).

205. *Kinzenbaw v. Deere & Co.*, 741 F.2d 383, 389-90 (Fed. Cir. 1984), *cert. denied*, 470 U.S. 1004 (1985) (upholding the application of prosecution history estoppel without considering the necessity of an amendment to overcome prior art).

206. *Hormone Research Found., Inc. v. Genentech, Inc.*, 904 F.2d 1558, 1564 n.9 (Fed. Cir. 1990) (stating that estoppel may still apply even when the examiner indicates that the claims in suit were allowable), *cert. dismissed*, 499 U.S. 955 (1991).

rise to estoppel,²⁰⁷ they are often indistinguishable from those made for overcoming the prior art.²⁰⁸ This distinction among acts giving rise to estoppel lacks clarity and introduces significant uncertainty to infringement results when accused infringers request application of prosecution history estoppel.²⁰⁹

Furthermore, extensive use of prosecution history estoppel may tend to discourage applicants from clearly defining the invention over the prior art and explaining its advantage in sufficient detail. When applying the estoppel doctrine, the courts often decline to find infringement under the doctrine of equivalents when the replaced element in the accused product does not have exactly the same features and does not create the same advantage.²¹⁰ To avoid this disadvantageous result, U.S. applicants tend to avoid amendments which clearly distinguish prior art and a discussion of the advantages. This frustrates the patent goal of disseminating technical information via patent disclosure.²¹¹

Even worse, patent application amendments and concerns about

207. *Moeller v. Ionetics, Inc.*, 794 F.2d 653, 659-60 (Fed. Cir. 1986) (holding that an examiner's amendment, for the purpose of "pointing out" the invention, did not give rise to estoppel as a matter of law).

208. *See Hi-Life Prods., Inc. v. American Nat'l Water-Mattress Corp.*, 842 F.2d 323 (Fed. Cir. 1988). In *Hi-Life*, the majority found summary judgment on the issue of estoppel to be inappropriate because the amended claims did not render the subject patentable. *Id.* at 326. The dissent, however, pointed out a statement by the examiner indicating that the limitation in the claim rendered it patentable. *Id.* at 326-27 (Davis, J., dissenting).

209. *James, supra* note 200, at 512-13 (discussing the uncertainty introduced by the application of prosecution history estoppel).

210. *See Hogan AB v. Dresser Indus., Inc.*, 9 F.3d 948, 954-55 (Fed. Cir. 1993) (holding that the district court did not err in its judgment of non-infringement).

211. In 1948, Judge Learned Hand remarked about the tension involved in patent drafting:

On the one hand, if he confines himself rigidly to those elements as they appear in the specifications, he deprives the patent of any practical value, because it is always, or almost always, possible to change the form of these as they appear, and yet cull the full advantage of the discovery. On the other hand, if he too much abandons the elements as they are disclosed, he will not "particularly point out . . . the part . . . or combination which he claims."

Royal Typewriter Co. v. Remington Rand, Inc., 168 F.2d 691, 693 (2d Cir.), *cert. denied*, 335 U.S. 825 (1948) (omission in original).

foreign applications may give rise to prosecution history estoppel with respect to the corresponding U.S. patents.²¹² To avoid this disadvantage, U.S. attorneys are often reluctant to clarify the invention over the prior art in other jurisdictions. As a result, the U.S. patent system forces foreign patent systems to introduce unreasonable practices such as insufficient clarification of the distinguishable feature and advantage of the invention over the prior art.

On the other hand, the more liberal viewpoint favors patentees by allowing alterations of the claim during prosecution without necessarily surrendering those changes to application of prosecution history estoppel.²¹³ Under this viewpoint, the doctrines of both prosecution history estoppel and equivalents are weighed by the courts in an equitable, balancing manner.²¹⁴ Prior to *Hilton Davis*, the Federal Circuit had begun to apply the more stringent approach whereby the court found that the claims were altered to avoid unpatentability under prior art.²¹⁵ The *Hilton Davis* majority applied the doctrine of equivalents, notwithstanding the doctrine of prosecution history estoppel, and returned to the more liberal stance.²¹⁶

The *Hilton Davis* majority went further than the existing case law and clarified the scope of what is reserved for the patentee under the doctrine of equivalents.²¹⁷ Although case law adhering to the liberal view required courts to determine the scope of the doctrine of equivalents or of estoppel, no case expressly indicated

212. *Caterpillar Tractor Co. v. Berco, S.p.A.*, 714 F.2d 1110, 1116 (Fed. Cir. 1983) (stating that representations made to foreign patent offices may be considered in determining the applicability of estoppel).

213. *Black & Decker v. Hoover Serv. Ctr.*, 886 F.2d 1285, 1295 (Fed. Cir. 1989) (explaining that claim amendments do not necessarily preclude the application of prosecution history estoppel).

214. *Id.*; *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 870 (Fed. Cir. 1985).

215. *Wang Lab., Inc. v. Toshiba Corp.*, 993 F.2d 858, 867-68 (Fed. Cir. 1993) (holding that prosecution history estoppel is applicable when the patentee specifically limited the scope of his claims to a certain number of memory chips in order to overcome prior art).

216. *Hilton Davis*, 62 F.3d at 1528.

217. *Id.* at 1522-24.

how to determine that scope.²¹⁸ The *Hilton Davis* majority permitted application of the doctrine of equivalents and reclamation of the pH range surrendered during prosecution by reasoning that the lower range limitation was not included in order to distinguish the cited prior art.²¹⁹ The majority reasoned that prosecution history estoppel only limits the doctrine of equivalents to the extent necessary to distinguish the prior art.²²⁰ This view negates the necessity for the estoppel doctrine because prosecution history estoppel becomes truly important only if the prior art does not preclude the accused device. To permit prosecution history estoppel to co-exist with the range of what is limited by the prior art, the *Hilton Davis* majority merged prosecution history estoppel with the prior art limitation doctrine and removed the uncertainty and unfavorable practice resulting from prosecution history estoppel.

C. *The Substantial Difference Test Should Be Decided by Judges*

In tackling the final question, the *Hilton Davis* majority simply cited *Graver Tank* and declared that the jury must decide infringement under the doctrine of equivalents.²²¹ The doctrine originates from common law, and its application relates to the issues of fact.²²² The court's analysis is grossly oversimplified and does not consider the historical reality that patent infringement issues--both the legal and the equitable questions--were decided by courts of equity.

The majority's conclusion is in stark contrast to the decision in *Markman v. Westview Instruments, Inc.*,²²³ where the Federal Circuit also decided en banc that judges must decide the meaning of the literal claim.²²⁴ The Supreme Court has affirmed *Mark-*

218. *E.g.*, *Black & Decker*, 886 F.2d at 1294; *Loctite*, 781 F.2d at 871.

219. *Hilton Davis*, 62 F.3d at 1520.

220. *Id.*

221. *Id.* at 1518.

222. *Id.* at 1520.

223. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 116 S. Ct. 1384 (1996).

224. *Id.* at 970-71.

man and the Federal Circuit's determination regarding the respective roles of the judge and jury in interpreting a patent claim.²²⁵

Under U.S. patent law, defining the meaning of claim language is distinctly different from applying the claim language to the accused device in order to find literal and substantial identity.²²⁶ Thus, in theory, it is not unreasonable for each step to be decided by a different entity. In practice, however, the two steps are inseparable because judges usually define the claim language with the accused products in mind. A court can clearly define a claim in terms of whether it departs from, or is identical to, an accused product. This process allows a judge to resolve any material factual issues for the jury, which will then decide the literal and substantial identity of both the claim and the accused product. However, because most trial judges do not have particular training in either patent or technology law, they may be reluctant to resolve these issues.²²⁷ The Federal Circuit judges, however, are given the power to review these issues *de novo*, and they should take advantage of their special knowledge of these areas of law.²²⁸ This could significantly reduce the likelihood that infringement would be decided under the doctrine of equivalents.

Even when infringement is decided under the doctrine of equivalents, the jury should not be asked to determine whether the claimed invention and the accused product are substantially different.²²⁹ Judge Nies correctly observed that the issue of infringement under the doctrine of equivalents is a legal issue based on findings concerning factual issues.²³⁰ Juries must be given more detailed instructions regarding such factual issues.

225. *Markman v. Westview Instruments, Inc.*, 116 S. Ct. 1384 (1996).

226. For a general discussion of the steps for determining infringement, see CHISUM & JACOBS, *supra* note 126, § 2F.

227. Congress has given the Federal Circuit jurisdiction over patent appeals because its judges are familiar with patent technology. 28 U.S.C. § 1295 (1994).

228. *See, e.g.*, *Bose Corp. v. Consumers Union of the United States, Inc.*, 466 U.S. 485, 501 (1984) (stating that an "appellate court has the power to correct errors of law, including those that may infect a so-called mixed finding of law and fact, or a finding of fact that is predicated on a misunderstanding of the governing rule of law.").

229. *Hilton Davis*, 62 F.3d at 1579 (Nies, J., dissenting).

230. *Id.* (Nies, J., dissenting).

Because the substantial difference test is comparable to the non-obviousness test, the former test raises a question of law similar to the non-obviousness issues and should be decided by judges.²³¹

Patentability and infringement determinations are interrelated and should be decided in the same manner. This is particularly true in the United States where both issues are decided by the same court in an infringement action.²³²

The respective roles of the judge and jury in determining non-obviousness are clear and undisputed. To promote consistency and certainty, the doctrine of equivalents should be treated in a similar fashion. For example, to find a substantial difference, courts will consider whether one skilled in the art would have known of the interchangeability between the claimed element and the replaced element at the time of infringement.²³³ The jury must decide when infringement began and to what degree of knowledge one is skilled in the art.²³⁴ To determine whether there is a substantial identity, judges must decide, based on these facts, whether the interchangeability was known. In addition, they must determine if the claimed invention and the accused product both function in substantially the same way to produce the same result.²³⁵

In *Markman*, the Supreme Court found that a historical analysis was not helpful to determine whether a judge or a jury should ascertain a claim's meaning.²³⁶ The Court, however, considered "both the relative interpretive skills of judges and juries and the statutory policies that ought to be furthered by the allocation."²³⁷ Both functionality and policy considerations favor judges over juries to decide the substantial identity under the doctrine of

231. See *Julie Research Lab., Inc. v. Guildline Instruments, Inc.*, 501 F.2d 1131, 1135-36 (2d Cir. 1974) (stating that the non-obviousness test is ultimately a question of law).

232. German infringement courts cannot decide the validity of literal claim scope because the Federal Patent Court has exclusive jurisdiction to decide the literal scope validity. "Fixing Device" (*Befestigungsvorrichtung*), 19 INT'L REV. INDUS. PROP. & COPYRIGHT L. 243, 244 (1988) (BGH 1986).

233. *Hilton Davis*, 62 F.3d at 1519.

234. *Id.*

235. *Id.* at 1578 (Nies, J., dissenting).

236. *Markman*, 116 S. Ct. at 1389-93.

237. *Id.* at 1393-96.

equivalents because judges are more likely to give proper determinations on the factors than juries are, and there is a policy concern that there is a need for uniformity in the treatment of a given patent, which applies equally to both claim interpretation and determination under the doctrine of equivalents.²³⁸

IV. PROPOSAL: DYNAMIC INVENTION SCOPE THEORY

In her concurring opinion, Judge Newman urged both legal and industry professionals to propose a statutory procedure through which patentees can protect their continuing work.²³⁹ The doctrine of equivalents will have that same effect if the restated substantial difference test is similar to the non-obviousness test. Judge Newman, however, wished to legalize formally the doctrine because she believes uncertainty is introduced by the doctrine.²⁴⁰ Eliminating the doctrine of equivalents, however, cannot completely remove uncertainty; instead, the doctrine increases certainty once an objective test is established.²⁴¹ Consequently, the U.S. patent system does not need another procedure to replace the doctrine.

Judge Newman highlighted the important fact that the meaning of the claim changes as the technology progresses.²⁴² In the most advanced fields of technology, a pioneer invention can break through a major technological barrier and, in a short period of time, introduce variations and improvements which raise the state of art.²⁴³ This rapidly changes the meaning of the claim language. For example, development in the variety of materials in semiconductor, or integrated circuit, technology quickly changed the meaning of such terms as "semiconductor," "conductor," and "insulator."²⁴⁴ Similarly, the insulation between the electronic

238. *Id.*

239. *Hilton Davis*, 62 F.3d at 1536 (Newman, J., concurring). For instance, Judge Newman considered a statutory form called the "patent of addition" where additional disclosure and claims can be added to a patent after it has been issued. *Id.* at 1536 n.4 (Newman, J., concurring).

240. *Id.* at 1534-36 (Newman, J., concurring).

241. *See supra* part III.A.3.

242. *Hilton Davis*, 62 F.3d at 1530 (Newman, J., concurring).

243. *Id.* (Newman, J., concurring).

244. *Fujitsu v. TI*, Judgment of Tokyo Trial Court, Aug. 31, 1994, Hanrei Jiho (No. 1510) 35, Hanrei Taimuzu (No. 862) 108 (1995). In this case, the Tokyo

elements of the basic Kilby invention has now been replaced with a more advanced type of insulation.²⁴⁵ When a competitor replaces material or insulation based on technology which is obvious to one skilled in the art at the time of the replacement, it really represents copying and not substantial innovation.²⁴⁶ To prevent this copying, the patent should be interpreted to cover such obvious replacements, regardless of whether the inventor anticipated such developments and drafted claims to cover the replacement.²⁴⁷ Otherwise, pioneer inventors would not be fairly rewarded. Most pioneer inventions are not commercially successful and cannot be compensated unless extension to commercially successful improvements is available.

Some propose that the scope of the pioneer invention be limited to the scope enabled by the inventor.²⁴⁸ This makes it impossible to protect a patentee's future works. Because enablement is decided on the application date and the scope is limited, the coverage of future obvious variations would be excluded. Other scholars, in addition to Judge Nies, suggest that patentees who fail to cover variations adopted by competitors should resort to the reissue procedure.²⁴⁹

This proposal, however, does not work because enlarging the scope by means of the reissue procedure is also limited by the

District Court rejected the literal coverage of a pioneer invention for manufacturing integrated circuits. This included the modifications resulting from the later technological development. The court stated that there was no suggestion of the modification written in the disclosure. For a discussion of this case, see Terril G. Lewis, Comment, *Semiconductor Chip Process Protection*, 32 HOUS. L. REV. 555, 594-98 (1995).

245. See *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1570-71 (Fed. Cir. 1986) (acknowledging this breakthrough in technology).

246. *Id.* at 1563.

247. Judge Newman noted that the speed and ease of imitation favors a rule that tempers the rigors of literal claim interpretation. *Hilton Davis*, 62 F.3d at 1530 (Newman, J., concurring).

248. *Merges & Nelson*, *supra* note 174, at 860-62 (discussing the reverse doctrine of equivalents in order to limit the scope of the original patent).

249. Martin J. Adelman & Gary L. Francione, *The Doctrine of Equivalents in Patent Law: Questions that Pennwalt Did Not Answer*, 137 U. PA. L. REV. 673, 715-29 (1989).

scope in the specification on the application date and cannot be used to cover later developed variations.²⁵⁰ An important fact that these arguments fail to note is the purpose of both patent validity determination in an infringement action and the reissue procedures which correct the mistakes arising out of the examination at the Patent Office. This procedure only takes into account the state of the art on the date of the invention or application when the Patent Office examined the claim, which does not take future technology into account.²⁵¹

By using the same requirement that is used for patentability, the doctrine of equivalents effectively protects the inventor's further developments because obvious works are protected by the basic patent, and nonobvious works are protected by separate patents. It is possible for claim interpretation to be based on the dynamic invention scope theory that views invention scope as consisting of the claimed invention and its equivalents that are obvious to one skilled in the art on the invention date and thereby expands to include obvious equivalents as the technology progresses.²⁵² In this scheme, the Patent Office is responsible for making sure that the claimed invention does not override any other invention's scope of existing technology on the invention date. The infringement courts are responsible for examining whether the defendant's embodiment overrides any invention concept existing on the infringement date. In the United States, infringement courts are also responsible for correcting any errors made by the Patent Office in its examination of validity issues in an infringement action.

The dynamic invention scope theory originates from the practical view that accused products or processes are later developments by defendants, and that patentees can claim protection under the doctrine of equivalents for what they could have claimed had they

250. See *Hilton Davis*, 62 F.3d at 1536 (noting that the reissue period does not allow adding to the disclosure) (Newman, J., concurring).

251. *Id.* (Newman, J., concurring).

252. See generally Gregory J. Smith, *The Federal Circuit's Modern Doctrine of Equivalents in Patent Infringement*, 29 SANTA CLARA L. REV. 901, 916 (1989) (stating that every inventor should be entitled to a fair, common sense assessment of the invention's scope).

known of the future accused products or processes.²⁵³ The underlying policy of this theory is to protect only those creations which qualify for a patent. The practice in the United States prior to *Hilton Davis* was impractical and encouraged competitors to take advantage of the literalism of claim drafting; it required inventors to know about existing technology and possible future variations, as well as required inventors to draft claims to cover them.²⁵⁴ By deciding to apply, as of the time of infringement, the doctrine of equivalents using the substantial difference test in a manner comparable to the non-obviousness test, the *Hilton Davis* majority provided the procedure that Judge Newman has requested.

V. CONCLUSION

Although the *Hilton Davis* majority surprised U.S. patent practitioners and legal scholars who are familiar with the peripheral claiming principle, the decision will be welcomed by other jurisdictions because it adopted many aspects of the central claiming principle. The revival of the test in *Graver Tank* resulted in the merging of the patentability test with the infringement test.²⁵⁵ This moved U.S. patent claim interpretation closer to that of many other jurisdictions and increased its legal certainty.²⁵⁶ Affirmation of in-principle application of the doctrine of equivalents and limiting prosecution history estoppel to the extent necessary to overcome the prior art will also significantly contribute to ensuring legal certainty and harmonizing U.S. patent law with that of other jurisdictions.²⁵⁷ Although there are points that the *Hilton Davis* majority did not clarify and which may cause some confusion in the future,²⁵⁸ the substantial difference test is more beneficial than the subjective three-part identity test. The Federal Circuit appears to be about to adopt the theory of restructuring claim interpretation under the central claiming principle.

253. *Wilson Sporting Goods Co. v. David Geoffrey & Assocs.*, 904 F.2d 677 (Fed. Cir.), cert. denied, 498 U.S. 992 (1990).

254. See *Hilton Davis*, 62 F.3d at 1530-31 (Newman, J., concurring).

255. See *supra* part III.A.2.

256. See *supra* part III.A.1.

257. See *supra* part III.B.

258. See *supra* part III.A.4.

Once adopted, U.S. patent claim interpretation will be complete with respect to the patent policies of both encouraging innovation and disseminating technical information through the discovery of patented inventions.