

FOREIGN EQUIVALENTS OF THE U.S. DOCTRINE OF EQUIVALENTS: WE'RE PLAYING IN THE SAME KEY BUT IT'S NOT QUITE HARMONY

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Introduction

In the United States, the doctrine of equivalents provides that the scope of a patent claim can extend beyond the literal words of the claim so that a device containing elements equivalent to that claimed may infringe the patent.¹ This doctrine protects patent holders from copyists who seek to avoid infringement of patents by making minor, insubstantial changes to a patented invention.² This doctrine is controversial. Some argue that patent protection is useless in the absence of such a doctrine since a claim would be limited to its literal language and easily avoided by a copyist.³ Others argue that the doctrine subverts the statutory requirement⁴ that inventors “particularly point[] out and distinctly claim[] the subject matter which” is regarded as the invention.⁵ Against this basic policy tension, the Federal Circuit and the Supreme Court have struggled to define the proper circumstances and limitations for application of the doctrine.⁶

Turning our view internationally, international patent protection is still largely a country by country affair.⁷ Business often operates in a global marketplace, and many businesses seek patent protection in multiple countries. Harmonization of patent law is thus highly desirable from the business perspective. Lack of harmonization complicates patent prosecution⁸ and can impede the free flow of goods.⁹ Businesses must choose between living with an uncertain patent

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¹ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 732 (2002).

² *Id.* at 727.

³ See *infra* Part II.A.

⁴ See *infra* Part II.B.

⁵ 35 U.S.C. § 112 (2000).

⁶ Paul R. Michel, *The Role and Responsibility of Patent Attorneys in Improving the Doctrine of Equivalents*, 40 IDEA 123, 123 (2000).

⁷ This paper limits discussion to the U.S., U.K., Germany, and Japan. Many other legal systems follow the traditions of these four, and hence a survey of these four jurisdictions provides a good picture of the international legal environment of patent disputes. See e.g. International Association for the Protection of Intellectual Property (AIPPI), *Group Reports on The Role of Equivalents and Prosecution History in Defining the Scope of Patent Protection* (2003) available at http://www.aippi.org/reports/q175/q175_all_reports.pdf (providing detailed responses from 40 member country organizations regarding status of doctrine of equivalents).

⁸ See e.g. Kara M. Bonitatibus, Comment, *The Community Patent System Proposal and Patent Infringement Proceeding: An Eye Toward Greater Harmonization in European Intellectual Property Law*, 22 PACE L. REV. 201, 209-212 (2001) (describing complications in E.U.).

⁹ *Id.* at 230.

protection scope or expending capital on legal counsel (often, foreign legal counsel) to discern the patent's scope.¹⁰

Various treaties have streamlined the process by which patents are obtained in multiple countries.¹¹ In contrast, patent enforcement, and thus interpretation of patent scope, is based in national law.¹² Because national law can differ between countries, the scope of patent protection provided by an international patent application may therefore vary widely from country to country. The *Epilady* cases¹³ are a particularly poignant example, as different jurisdictions arrived at different outcomes in the same patent infringement dispute.¹⁴

The U.S. and many other nations have embarked upon a harmonization effort to bring a degree of uniformity to patent law.¹⁵ However, there are some areas of patent law where there are still substantial differences amongst various countries.¹⁶ The proper scope of a patent claim is one area that the world community struggles to harmonize.¹⁷ The doctrine of equivalents, perhaps because it is difficult to apply, is one area where application is particularly inconsistent.¹⁸ In part, this inconsistency is driven by national tradition. Some countries, including Japan and the United Kingdom, traditionally interpreted claims very literally, and thus did not until recently have any doctrine analogous to the U.S. doctrine of equivalents.¹⁹ Conversely, other countries, including Germany, interpreted claims very broadly and incorporated doctrines similar to the U.S. doctrine of equivalents into their approach to determining literal infringement.²⁰ Even among those countries that recognize the doctrine of equivalents, the tests to determine non-literal infringement are not identical.²¹ Interestingly, the International Association for the Protection of Intellectual Property (AIPPI) noted that among the

¹⁰ See John P. Hatter, Jr, Comment, *The Doctrine of Equivalents in Patent Litigation: An Analysis of the Epilady Controversy*, 5 IND. INT'L & COMP. L. REV. 461, 461 (1995).

¹¹ See *infra* Part I.

¹² Allan M. Soobert, *Analyzing Infringement by Equivalents: A Proposal to Focus the Scope of International Patent Protection*, 22 RUTGERS COMPUTER & TECH. L.J. 189, 190 (1996)

¹³ *Improver Corp. v. Remington Consumer Products Ltd.*, [1990] F.S.R. 181 (Pat. Ct. 1989); *Improver Corp. v. Remington Products Inc.*, [2002] G.R.U.R. 515, translated in 24 INT'L REV. OF INDUS. PROP. & COPYRIGHT LAW 838, 842 (this *Bundesgerichtshof* (German Supreme Court) case is also referred to as *Schneidmesser I* (Cutting Blade I)).

¹⁴ Mario Franzosi, *Equivalence in Europe*, [2003] E.I.P.R 237, 237-241.

¹⁵ See *infra* Part I.

¹⁶ See e.g. Bernarr R. Pravel, *Why the United States Should Adopt a First to File System for Patents*, 22 ST. MARY'S L.J 797 (1991) (describing first to file versus first to invent debate).

¹⁷ See e.g. Soobert, *supra* note 12, at 201-220 (discussing lack of uniformity between U.S., U.K., and German claim interpretation approaches).

¹⁸ See Soobert, *supra* note 12 at 195-221.

¹⁹ William C. Revelos, Note, *Patent Enforcement Difficulties in Japan: Are There Any Satisfactory Solutions for the United States?*, 29 GEO. WASH. J. INT'L L. & ECON. 503, 521 (1995) (discussing Japan); Soobert, *supra* note 12, at 203 (discussing U.K.).

²⁰ Soobert, *supra* note 12, at 207.

²¹ International Association for the Protection of Intellectual Property (AIPPI), Committee Q175, Summary Report, *The role of equivalents and prosecution history in defining the scope of patent protection* 1(2003), available at http://www.aippi.org/reports/q175/q175_summary_e.pdf.

E.U. countries that should have identical law under the European Patent Convention, there are many differences in patent claim interpretation.²²

With the exception of the TRIPS agreement,²³ nations interested in harmonization have not effectuated an international patent treaty that affects substantive rules. Efforts to negotiate the Patent Harmonization Treaty failed in 1995.²⁴ The recently concluded Patent Law Treaty primarily affects procedural (filing) issues.²⁵ Further, efforts behind a so-called Substantive Patent Law Treaty may not bear fruit.²⁶

Interestingly, in spite of these failed efforts to harmonize, countries are coming closer together in their substantive patent law. There is significant convergence between the U.S., E.U., and Japan in claim interpretation and application of the doctrine of equivalents.²⁷ Although Japan did not generally apply a doctrine of equivalents a decade ago,²⁸ Japan now embraces the doctrine along lines similar to the U.S.²⁹ Similarly, the E.U. uses equivalents, which were written into the Revised European Patent Convention, to determine infringement.³⁰ A regional Europe-Asia agreement also calls for the use of equivalents in determining patent infringement.³¹ The AIPPI conducted a survey of its national groups regarding the status of the doctrine of equivalents in various countries.³² The survey responses from forty countries indicated that the majority recognized some form of the doctrine, but few had applied the doctrine in actual case law.³³

Many countries follow the lead of others in developing their law.³⁴ For example, the E.U. adopted the European Patent Convention (EPC) which sets out common rules of patent interpretation.³⁵ Even though E.U. members held divergent views on the proper scope of patent

²² *Id.* at 1-2; *See also* Hatter, *supra* note 10, at 471-487 (describing differing results obtained by British and German courts considering alleged infringement of same patent by same product).

²³ Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), art. 27-34, Dec. 15, 1993, 33 I.L.M. 1197 (1994) [hereinafter TRIPS Agreement].

²⁴ Peter A. Jackman, *Adoption of a First-To-File Patent System: A Proposal*, 26 U. BALT. L. REV. 67, 68 (1997).

²⁵ Patent Law Treaty, art. 5-14, June 1, 2000, 39 I.L.M. 1097.

²⁶ Andrew R. Sommer, *Trouble on the Commons: A Lockean Justification for Patent Law Harmonization*, 87 J. PAT. & TRADEMARK OFF. SOC'Y 141, 148-149 (2005).

²⁷ *See infra* Part III-VII. This paper focuses on the U.S., the E.U., and Japan. A review of other countries indicates that many follow the lead of these four entities. *See supra* note 21.

²⁸ Revelos, *supra* note 19, at 522-523.

²⁹ Toshiko Takenaka, *The Supreme Court Affirmed the Presence of the Doctrine of Equivalents under Japanese Patent System*, 5 CASRIP NEWSLETTER (Winter 1998) [hereinafter Takenaka, *Doctrine Affirmed*].

³⁰ (Revised) European Patent Convention, Protocol on Interpretation of Article 69 EPC, art. 2 (to enter into force in 2006-7), available at http://www.european-patent-office.org/epo/dipl_conf/pdf/03_ins3_003_073.pdf (last accessed May 19, 2006)

³¹ Patent Regulations under the Eurasian Patent Convention, rule 12 (2003), available at http://www.wipo.int/clea/docs_new/pdf/en/ea/ea002en.pdf.

³² *Supra* note 21.

³³ *Id.*

³⁴ *See e.g.* Toshiko Takenaka, *What Japan Should Learn from U.S. Experiences: Tests of Equivalence, Means-Plus-Function Claims and Product-By-Process Claims*, CASRIP NEWSLETTER (Winter 2002).

³⁵ Convention on the Grant of European Patents (European Patent Convention), art. 69, Oct. 5, 1973, 13 I.L.M. 270 [hereinafter EPC].

claims,³⁶ the members referenced decisions across country borders to reach common rules of interpretation and support their view.³⁷ In spite of some uncertainty as to whether the doctrine of equivalents is allowed under the EPC, the E.U. has applied and defined the doctrine.³⁸ In contrast, Japan hesitated to codify the doctrine because it was uncertain that it fully comprehended the use and application of the doctrine in either the U.S. or the E.U.³⁹ Hence, Japan allowed the doctrine to develop under its own case law.⁴⁰ Accordingly, judicial law has taken the place of treaty negotiations in bringing international convergence of the doctrine of equivalents. As detailed herein, even though the tests for non-literal infringement may be worded differently in different countries, widespread recognition of common principles underlying the doctrine of equivalents now exists, and some elements of the test for non-literal infringement are identical between countries.⁴¹

This paper reviews the doctrine of equivalents from an international perspective and concludes that many countries appear to share the same policy principles underlying the doctrine. Part I reviews the failed treaty attempts to harmonize patent scope interpretation. Part II of this paper provides a review of the policy behind the doctrine of equivalents. Parts III through VII then demonstrate that, for the most part, “we’re playing in the same key,” as there is a high level of agreement on principles for applying the doctrine of equivalents to determine infringement. However, there “it’s not quite harmony” as there are some differences. The paper concludes that the continued evolution of common law may lead to harmonizing the few remaining international disconnects in applying the doctrine of equivalents to determine patent infringement.

I. Dissonance in Treaty-Driven Attempts to Harmonize

Formal patent law harmonization activities to date have proceeded quite slowly and have been limited to addressing procedural aspects of patent grants. Substantive law has been relatively unaffected by international treaties. Patent harmonization began as a part of the Paris Convention of 1883, a major provision of which required countries to provide similar treatment to both foreign nationals and citizens under national patent laws as well as to provide a right of priority to foreign filings.⁴² The Patent Cooperation Treaty (PCT) followed, creating the World Intellectual Property Organization (WIPO) and providing a single first step for filing patents that would establish a patent priority date recognized by all member states.⁴³ Although the PCT

³⁶ See *infra* Part III.B-III.C.

³⁷ See Hatter, *supra* note 10, at 476.

³⁸ See Nicholas Pumfrey, *The Doctrine of Equivalents in UK Patent Law: Does it Exist? How Does it Work?*, Presented at the AIPLA Annual Meeting, Oct. 14, 2004, Washington. Based on legislative history, it appears that the EPC neither allows nor disallows the doctrine of equivalents in light of the inability of the member nations to agree on the subject. See Christopher Heath, *Harmonizing Scope and Allocation of Patent Rights in Europe – Towards A New European Patent Law*, 6 MARQ. INTELL. PROP. L. REV. 11, 35 (2002).

³⁹ Toshiko Takenaka, *Japan: The Proposal for Patent Law Revision*, 1 CASRIP NEWSLETTER (Fall 1994) [hereinafter Takenaka, *Japan Revisions*].

⁴⁰ Takenaka, *Doctrine Affirmed*, *supra* note 29.

⁴¹ See *infra* Part III-VII.

⁴² Paris Convention for the Protection of Industrial Property, art. 4, Mar. 20, 1883, 21 U.S.T. 1583, 828 U.N.T.S. 305 [hereinafter Paris Convention].

⁴³ Patent Cooperation Treaty, June 19, 1970, 28 U.S.T. 7645, T.I.A.S. 8733.

provides for a single international filing, patent protection is still governed by national law in each member state.⁴⁴ Thus, the PCT stopped short of harmonizing national law, and nationalization (translation and prosecution of applications in each nation for which protection is desired) is still necessary.⁴⁵

The WIPO attempted to multilaterally harmonize substantive patent law in the early 1990s,⁴⁶ but failed when the U.S. withdrew from negotiations.⁴⁷ The proposed patent harmonization treaty would have defined the doctrine of equivalents using wording almost identical to that of the European Patent Convention.⁴⁸ However, several regional agreements have been concluded. The E.U. concluded its European Patent Treaty and initiated the harmonization process for E.U. law.⁴⁹ The U.S. and Japan entered into bilateral agreements to change their patent systems to bring them more in line with each other.⁵⁰

The TRIPS Agreement is, to date, the most substantive international agreement affecting national patent law, and provides the World Trade Organization (WTO) members with minimum standards for patent systems.⁵¹ However, the minimum standards fail to address how to determine infringement or apply a doctrine of equivalents.⁵²

New efforts to negotiate a “Substantive Patent Law Treaty” (SPLT) are underway,⁵³ and drafts of this treaty include language to harmonize application of the doctrine of equivalents.⁵⁴ It should be noted that the SPLT requires the interpretation of claim scope to take “due account . . . of elements which are equivalent to the elements expressed in the claim[.]”⁵⁵ Interpretation shall also take into account the “general knowledge of a person skilled in the art on the *filing date*.”⁵⁶ Hence, the proposed treaty would employ a European approach to determine the date of interchangeability.⁵⁷ However, the failure to define what constitutes an “equivalent” element

⁴⁴ *Id.* art. 1, 27.

⁴⁵ Gerald J. Mossinoff & Vivian S. Kuo, *World Patent System Circa 20XX, A.D.*, 80 J. PAT. & TRADEMARK OFF. SOC'Y 523, 545 (1998).

⁴⁶ See Anneliese M. Seifert, Comment, *Will the United States Take the Plunge into Global Patent Law Harmonization? A Discussion of the United States' Past, Present, and Future Harmonization Efforts*, 6 MARQ. INTELL. PROP. L. REV. 173, 184-185 (2002).

⁴⁷ Jackman, *supra* note 24.

⁴⁸ See Hatter, *supra* note 10, at 492.

⁴⁹ EPC, *supra* note 35.

⁵⁰ Exchange of Letters Containing Patent Systems Agreement, Aug. 16, 1994, U.S.-Japan, 34 I.L.M. 121, 123-24 (1995) (these changes were implemented in the U.S. by the American Inventors Protection Act of 1999, Pub. L. No. 106-113, 4001, 113 Stat. 1501A-552 (1999) (providing publication of pending applications and other provisions requested by U.S. trading partners)).

⁵¹ TRIPS Agreement, *supra* note 23, art. 24-34. The U.S. entered into the TRIPS agreement along with other members of the WTO. Uruguay Round Agreements, Pub. L. No. 103-465, 108 Stat. 4809 (Dec. 8, 1994).

⁵² Doris Estelle Long, *The Impact of Foreign Investment on Indigenous Culture: An Intellectual Property Perspective*, 23 N.C.J. INT'L L. & COM. REG. 229, 265 (1998).

⁵³ Sommer, *supra* note 26.

⁵⁴ See WIPO, Draft Substantive Patent Law Treaty, art. 11(b), Document SCP/10/2 (Sept. 30, 2003), available at http://www.wipo.int/scp/en/documents/session_10/pdf/scp10_2.pdf.

⁵⁵ *Id.*

⁵⁶ *Id.* art 11(a) (emphasis added).

⁵⁷ See *infra* Part V.

may cause controversy.⁵⁸ Whether the SPLT will be adopted remains to be seen. In the meantime, significant progress has been made by the judiciary in its development of the common law.

II. Enter the Common Law: Balancing Competing Policy Tensions

The doctrine of equivalents is a judicially crafted attempt to balance two competing demands on the patent system. On the one hand is a desire to ensure a patentee is granted an adequate range of protection in exchange for the disclosure of the invention.⁵⁹ The grant of the patent monopoly is the constitutionally provided incentive for the inventor to disclose, rather than keep secret, the invention.⁶⁰ On the other hand is a desire to properly inform the public of the claimed limits of the patent monopoly to fairly and adequately provide the public with the means to avoid patent infringement.⁶¹ This policy tension was nicely summarized in *London v. Carson Pirie Scott & Co.*⁶²:

On the one hand, claims must be “particular” and “distinct,” as required by 35 U.S.C. § 112, so that the public has fair notice of what the patentee and the Patent and Trademark Office have agreed constitute the metes and bounds of the claimed invention. Notice permits other parties to avoid actions which infringe the patent and to design around the patent.

On the other hand, the patentee should not be deprived of the benefits of his patent by competitors who appropriate the essence of an invention while barely avoiding the literal language of the claims.⁶³

A. Protecting the Patentee

Looking first at the protection of the patentee, there are two reasons not to limit a claim to its literal language. First, the doctrine of equivalents serves to protect a patentee from the imperfections of language.⁶⁴ That is to say, language is an imprecise vehicle to describe technical concepts, yet this is exactly what a patent claim aims to accomplish.⁶⁵ The U.S.,⁶⁶ the United Kingdom,⁶⁷ Germany,⁶⁸ and Japan all recognize this concept.⁶⁹ The doctrine of

⁵⁸ See *infra* Part IV.

⁵⁹ *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 607 (1950).

⁶⁰ U.S. CONST. art. I, §8, cl. 8 (“To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries”).

⁶¹ *White v. Dunbar*, 119 U.S. 47, 52 (1886).

⁶² 946 F.2d 1534 (Fed. Cir. 1991).

⁶³ *Id.* at 1538 (citations omitted).

⁶⁴ *Claude Neon Lights v. E. Machlett & Son*, 36 F.2d 574, 576 (2d Cir. 1929); Symposium, *Franklin Pierce Law Center Sixth Biennial Patent Symposium Major Problems Conference*, 37 IDEA 623, 728 (1997) [hereinafter “IDEA 1997 Symposium”] (remarks of Robert Armitage).

⁶⁵ See Ray D. Weston, *A Comparative Analysis of the Doctrine of Equivalents: Can European Approaches Solve an American Dilemma*, 39 IDEA 35, 40 (1998).

⁶⁶ *Festo Corp. v. Shokensu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731 (2002).

⁶⁷ See Pumfrey, *supra* note 38 (discussing *Catnic v. Hill & Smith Ltd.*, [1982] R.P.C. 183 (H.L. 1980)).

⁶⁸ See Peter Meier-Beck, *The Scope of Protection Conferred by the European Patent: A German Perspective on the Doctrine of Equivalents* 5, Presented at the AIPLA Annual Meeting, Oct. 14, 2004, Washington DC.

⁶⁹ See Takenaka, *Doctrine Affirmed*, *supra* note 29 (discussing and translating *Genentech Inc. v. Sumitomo Seiyaku K.K.*, 1586 Hanrei Jiho 117 (Osaka High Ct., 1996) (Japan)).

equivalents serves to protect a patentee from an “unscrupulous copyist” who appropriates the essence of the invention, but avoids infringement by making insubstantial changes to the invention and circumvents the literal language of the claim.⁷⁰

Second, the doctrine is necessary to protect a patentee from unforeseen advances in technology.⁷¹ Language limits a patentee’s claim because patents are described using words of art, and it is impossible to describe an invention in terms other than those currently available in the art as “words may not exist to describe it.”⁷² An invention may rely on new principles that are not yet fully understood.⁷³ In the rush to file applications, inventors and their attorneys often fail to appreciate the full potential scope and impact of the invention until later development or commercialization of the invention.⁷⁴ Hence, by allowing a patent claim to cover a wide range of equivalents, a pioneering inventor is provided a greater scope of protection commensurate with the inventor’s contribution to the art.⁷⁵

B. *Protecting the Public Interest*

On the other hand, patent claims also provide a notice function. Fairness to the public requires that the patentee provide the public with fair notice about the patentee’s claimed monopoly.⁷⁶ This is codified in U.S. law in the requirement that a patentee clearly define the scope of the claimed invention.⁷⁷ In *Winans*,⁷⁸ the case generally credited with originating the doctrine of equivalents,⁷⁹ dissenters objected to the doctrine due to the uncertainty it could create in the scope of the patent monopoly.⁸⁰ By clearly defining the scope of the patent monopoly, the public is encouraged to design around the patented invention by using either prior art techniques or providing new innovations patentable in their own right.⁸¹ If the scope of a patent is unclear, competition may suffer if companies are unwilling to assume the risk of patent infringement in areas related to the patent.⁸² This uncertainty may serve as a disincentive to conduct research for all but the most financially secure enterprises.⁸³

⁷⁰ *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 607 (1950).

⁷¹ *Festo Corp.*, 234 F.3d 558, 619 (Fed. Cir. 2000) (Rader, J., concurring in part and dissenting in part) (citing *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 37 (1997)).

⁷² *Autogiro Co. of Am. v. U.S.*, 384 F.2d 391, 397 (Ct. Cl. 1967).

⁷³ See John A. Burtis, Comment, *Towards a Rational Jurisprudence of Computer-Related Patentability in Light of In re Alappat*, 79 MINN. L. REV. 1129, 1136 n.34 (1995).

⁷⁴ Harold Wegner, *Equitable Equivalents: Weighting the Equities to Determine Patent Infringement in Biotechnology and Other Emerging Technologies*, 18 RUTGERS COMPUTER & TECH. L.J. 1, 35-36 (1992).

⁷⁵ Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75, 81 (1994).

⁷⁶ *White v. Dunbar*, 119 U.S. 47, 52 (1886).

⁷⁷ 35 U.S.C. § 112 (2000).

⁷⁸ *Winans v. Denmead*, 56 U.S. 330, 347 (1854).

⁷⁹ *But see* Wegner, *supra* note 74, at 6-16 (summarizing pre-*Winans* development of doctrine).

⁸⁰ 56 U.S. at 347 (Campbell, J. dissenting).

⁸¹ J. Jason Lang, Comment, *The German Resolution: A Proposed Doctrine of Equivalents Analysis and A Flexible Rule of Prosecution History Estoppel for Biotechnology*, 52 EMORY L.J. 427, 431 (2003).

⁸² *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 597 (Fed. Cir. 2000) (Lourie, J., concurring).

⁸³ See Wegner, *supra* note 74, at 29.

C. *Judicial Balancing*

Most judicial disagreement in individual cases revolves around the balance between these competing interests. Various theories about the proper scope of a patent are often supported by economic considerations.⁸⁴ Unfortunately, practical application of these theories is difficult as observed by Federal Circuit Judge Newman.⁸⁵ Judge Learned Hand suggested that a balancing test will lead to inconsistent decisions.⁸⁶ Judges from other countries seem to agree.⁸⁷ The lack of predictability is perhaps a result of the equitable origins of the doctrine – equity is often a judgment call.

The policy tension is widely recognized internationally. For example, in the E.U., the EPC defines the scope of protection provided by patent claims.⁸⁸ An integral part of the EPC is the Protocol on Interpretation of the European Patent Convention,⁸⁹ which advises member countries on how to interpret claims.⁹⁰ The protocol states:

Article 69 should not be interpreted [so] that the extent of the protection conferred by a European patent is ... defined by the strict, literal meaning of the wording used in the claims, Neither should it be interpreted . . . that the claims serve only as a guideline On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.⁹¹

With tension between these two different policies, it is not surprising that different jurisdictions have drawn lines differently. Traditionally, the U.K. leaned more toward protecting the public interest because patent law is an exception to the ban on monopolies.⁹² Similarly, Japan leaned toward the public interest because it viewed the dissemination of new technology into industry as outweighing the incentive benefits of exclusive protection.⁹³ Conversely,

⁸⁴ See Mark Lemley, *The Economics of Improvements in Intellectual Property Law*, 75 TEX. L. REV. 989, 1000-1013, 1044-1071 (1997); A. Samuel Oddi, *Un-unified Economic Theories of Patents – The Not-Quite-Holy Grail*, 71 NOTRE DAME L. REV. 267, 317-327 (1996); Mark F. Grady and Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305, 318-321 (1992); Robert P. Merges and Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 868-908 (1990); Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & ECON. 265, 275-80 (1977).

⁸⁵ *Hilton Davis Chemical Co. v. Warner-Jenkinson Co.*, 62 F.2d 1512, 1531 (Fed. Cir. 1995) (Newman, J. concurring).

⁸⁶ *Claude Neon Lights, Inc. v. E. Machlett & Son*, 36 F.2d 574, 575 (2d Cir. 1929).

⁸⁷ Meier-Beck, *supra* note 68, at 5 (Justice, German Supreme Court); Pumfrey, *supra* note 38, at 9 (Justice, UK High Court, Chancery Division).

⁸⁸ EPC, art. 69, 5 Oct., 1973, 13 I.L.M. 270.

⁸⁹ *Id.*, art. 164(1).

⁹⁰ *Id.*, Protocol on the Interpretation of Article 69 of the Convention.

⁹¹ *Id.*

⁹² Weston, *supra* note 65, at 49.

⁹³ Toshiko Takenaka, Symposium, *Re-Engineering Patent Law: The Challenge of New Technologies, Part III: International and Comparative Law Issues: Patent Infringement Damages in Japan and the United States: Will Increased Patent Infringement Damage Awards Revise the Japanese Economy?*, 2 WASH U. J.L. & POL'Y 309, 309-310 (2000); Stephen Lesavich, Comment, *The New Japan-U.S. Patent Agreements: Will They Really Protect U.S. Patent Interests in Japan?*, 14. WIS. INT'L L. J. 155, 162 (1995)

Germany tended to favor the inventor.⁹⁴ In spite of this differing background, several common principles have emerged to determine infringement under the doctrine of equivalents.

III. International Consensus: The All Elements Rule

The first commonly recognized principle is that analysis of infringement under the doctrine of equivalents is performed on an element by element basis. That is, an accused device infringes another's patent⁹⁵ "if it embodies each claim element or its equivalent."⁹⁶ The principle is so well accepted that it is hardly mentioned in recent cases, and the analysis proceeds directly to application of the doctrine of equivalents to those elements that do not fall within the literal language of the claim.

A. *The U.S.: Changing History of Claim Interpretation*

In the U.S., claim interpretation has undergone a changing history. Originally, patents were written without claims, and infringement analysis determined whether the accused device was sufficiently similar to the embodiments described in the patent specification.⁹⁷ Claims were not part of U.S. patents until the Patent Act of 1870 gave claims increased significance.⁹⁸ At that time, the U.S. used an approach known as "central claiming," where a claim was said to capture the central point of the invention.⁹⁹ Under this practice, claims sometimes included language that made reference to the embodiments illustrated in the specification.¹⁰⁰ Courts thus enjoyed a great deal of leeway in determining the scope of the patent monopoly.¹⁰¹

The U.S. shifted to a practice of peripheral claiming after *Graham v. John Deere Co.*¹⁰² Peripheral claiming is where a patentee sets out the metes and bounds of the claimed monopoly.¹⁰³ The U.S. patent office and the patentee negotiate over the language of the claims through an exchange of office actions and amendments. The patent office ensures that the claims do not read upon prior art and that the patentee does not attempt to claim more than what the patentee is legally entitled to claim.¹⁰⁴ The shift from central claiming to peripheral claiming enhances the notice function of claims. Peripheral claiming, however, makes the language of the

⁹⁴ Weston, *supra* note 65, at 52.

⁹⁵ For simplicity, the discussion assumes an apparatus that is alleged to infringe. Patent claims may also cover a process, composition of matter, or article of manufacture. 35 U.S.C. § 101 (2000). Similar rules apply in other countries. See e.g. EPC, *supra* note 35, art. 52 (allowing patents for novel inventions of industrial applicability), Japanese Patent Act, art. 29 (same), available at http://www.wipo.int/clea/docs_new/pdf/en/jp/jp036en.pdf.

⁹⁶ *Jeneric/Pentron, Inc. v. Dillon Co.*, 205 F.3d 1377, 1380 (Fed. Cir. 2000).

⁹⁷ Wegner, *supra* note 74, at 17.

⁹⁸ *Id.* at 18.

⁹⁹ See Frank S. Molinaro, *Pennwalt Corp. v. Durand-Wayland Inc. – The Federal Circuit Redefines the Doctrine of Equivalents*, 38 DEPAUL L. REV. 787, 792 n.34 (1989).

¹⁰⁰ See e.g. *Winans v. Denmead*, 56 U.S. 330, 340 (1854) (providing example of claim referencing specification).

¹⁰¹ See *id.* at 343 (stating "having described his invention, ... [the patentee] is deemed to claim every form in which his invention may be copied"); Molinaro, *supra* note 99.

¹⁰² 383 U.S. 1, 148 (1966). See *Pennwalt Corp. v. Durand-Wayland Inc.*, 833 F.2d 931, 959 (Fed. Cir. 1987) (Newman, J. dissenting) (summarizing history of claim drafting and claim interpreting practices).

¹⁰³ Molinaro, *supra* note 99.

¹⁰⁴ Stephen G. Whiteside, *Patents Claiming Genetically Engineering Inventions: A Few Thoughts on Obtaining Broad Property Rights*, 30 NEW ENG. L. REV. 1019, 1021 (1996).

claims far more critical, and thus a higher burden falls upon the drafting patent attorney.¹⁰⁵ Under a peripheral claiming system, the doctrine of equivalents helps to protect an inventor from mistakes in the claim drafting process that overly limit the scope of the claim.¹⁰⁶

With this gradual shift from central to peripheral claiming, infringement analysis also shifted from looking at the invention as a whole to requiring the accused infringing device to have each element of the claim.¹⁰⁷ The all elements rule was restated in *Pennwalt*, putting to end prior confusion that infringement under the doctrine might be found by applying the test to the invention as a whole.¹⁰⁸ The Federal Circuit later clarified that the element by element analysis must consider all of the limitations included in the claim.¹⁰⁹

B. *The U.K.: Antimonopoly Roots*

British patent law pioneered a shift from a central claim approach to a peripheral claim approach that was later adopted by the U.S.¹¹⁰ Unlike the U.S., however, the U.K. tended toward fairly narrow interpretations of claims, which shifted the balance of protection toward the public.¹¹¹ The U.K. recognized a doctrine of equivalents, referred to as the doctrine of “pith and marrow.”¹¹² Under this doctrine, if an accused device contains all of the elements of the claim, but some “inessential elements” are substituted with equivalent elements, then non-literal infringement of a patent is found.¹¹³ To determine infringement, juries are specifically instructed to look for each of the essential features of the claimed invention in the accused device.¹¹⁴ Hence, to infringe, “every element and limitation ... is essential.”¹¹⁵

The U.K. analysis of a patent infringement survived the EPC, but it was slightly modified. A new formula to determine patent infringement using a so-called “purposive construction” was articulated in the famous *Catnic* case.¹¹⁶ The language of this case, and the later *Improver*¹¹⁷ case, clarify that the focus of infringement analysis is directed at the elements that differ between the accused device and claimed patent’s technical features. Hence, the U.K. continues to require that all elements are present.

¹⁰⁵ See *Pennwalt*, 833 F.2d at 959.

¹⁰⁶ It has been argued that the doctrine of equivalents served the purpose of protecting patentees in the switch from central claiming to peripheral claiming, and no longer serves a useful purpose given the extensive experience with peripheral claiming that law now has. IDEA 1997 Symposium *supra* note 64, at 719 (remarks of Charles Gholz, 1997). See also Wegner, *supra* note 74, at 19 (discussing reduced need for doctrine of equivalents in peripheral claiming system except where equitable considerations demand).

¹⁰⁷ *Autogiro Co. of Am. v. U.S.*, 181 Ct. Cl. 55, 72 (Ct. Cl. 1967).

¹⁰⁸ 833 F.2d at 949-954 (J. Nies, concurring); See also *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 29 (1997) (setting forth same rule).

¹⁰⁹ Thomas K. Landry, *Certainty and Discretion in Patent Law: The On Sale Bar, The Doctrine of Equivalents and Judicial Power in the Federal Circuit*, 67 S. CAL. L. REV. 1151, 1193 (1994).

¹¹⁰ Weston, *supra* note 65, at 47-49.

¹¹¹ *Id.* at 49-50.

¹¹² *Id.*

¹¹³ *Id.* at 50-51.

¹¹⁴ *Id.* at 49.

¹¹⁵ *Id.* at 51.

¹¹⁶ Soobert, *supra* note 12 at 204 (citing *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1982] R.P.C 183 (H.L.)).

¹¹⁷ *Improver Corp. v. Remington Consumer Products Ltd.*, [1990] F.S.R. 181 (Pat. Ct. 1989)

C. *Germany and Japan: Influences from the U.S. and U.K.*

Germany's approach to infringement analysis mirrored that of the U.S. because it used a central claim approach and acknowledged that any accused device that embodied the same inventive concept as claimed in a patent infringed that patent.¹¹⁸ But, after Germany signed the EPC, it made a number of changes to its laws, which brought the E.U. closer to a common set of principles for infringement analysis.¹¹⁹ Germany now focuses on peripheral claiming.¹²⁰ Infringement analysis thus requires the court to look at the technical function of each of the individual features of the claims.¹²¹ This analysis considers "every single feature and . . . the mutual connection of all features of the claim."¹²²

Japan originally followed Germany's lead in developing patent law, but under influence of U.S. law, Japan adopted a much narrower interpretation of claims.¹²³ Thus, Japan also applies the "all elements" rule.¹²⁴

IV. Moving Towards an Interchangeability Test for Equivalent Elements

Although it is internationally agreed that the proper test for infringement under the doctrine of equivalents is to apply the all elements rule,¹²⁵ this leads to the question of what is required for an element of an infringing device to be the equivalent to the element of a claim. The proper test for determining whether an element is equivalent has been a subject of extensive debate both on the bench and among scholars.¹²⁶ Over the years, courts have articulated many different tests, but the clearest test is interchangeability: an accused element is equivalent to that of the claim if it can be substituted into the claimed device without changing the "principle and operation" of the patented device.¹²⁷

A. *Confusion in the U.S. Test of Equivalence: A Nod Towards Interchangeability*

For the U.S., the Supreme Court attempted to clarify the test of equivalence in *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*¹²⁸ The Court reaffirmed the Federal Circuit position that equivalency is a multi-faceted inquiry, taking into account the context of the patent,

¹¹⁸ Bonitatibus, *supra* note 8, at 220.

¹¹⁹ For example, The German Patent Act § 14 adopts the language of the European Patent Convention, requiring the scope of protection of a patent to be defined by the claim. Soobert, *supra* note 12, at 207 n.78.

¹²⁰ Meier-Beck, *supra* note 68, at 4.

¹²¹ *Id.* at 3.

¹²² *Id.* at 7.

¹²³ Toshiko Takenaka, *Harmonizing the Japanese Patent System with Its U.S. Counterpart Through Judge-Made Law: Interaction Between Japanese and U.S. Case Law Developments*, 7 PAC. RIM. L. & POL'Y 249, 252-253 (1998) [hereinafter Takenaka, *Harmonizing*].

¹²⁴ *Id.* at 253.

¹²⁵ See *supra* Part III.

¹²⁶ See IDEA 1997 Symposium *supra* note 64, at 623-742.

¹²⁷ *Texas Instruments, Inc. v. U.S. Int'l Trade Comm'n*, 805 F.2d 1558, 1571 (Fed. Cir. 1986); *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 25 (1997).

¹²⁸ 520 U.S. 17 (1997).

the prior art, and the factual particulars of the case.¹²⁹ In describing the factually intensive complexity of this inquiry, the Supreme Court has stated:

In determining equivalents, things equal to the same thing may not be equal to each other and, by the same token, things for most purposes different may sometimes be equivalents. Consideration must be given to the purpose for which an ingredient is used in a patent, the qualities it has when combined with the other ingredients, and the function which it is intended to perform.¹³⁰

Consequently, it is difficult to articulate any particular rule that allows for this test to be easily described. Courts over the years have used many different formulations of the test.¹³¹ For example, one frequently cited test of equivalence, although expressly disclaimed as being the only test for equivalence, is the “function-way-result” test.¹³² Under this test, an element is equivalent “if it performs substantially the same function in substantially the same way to obtain the same result” as the element in the patented invention.¹³³ This test, however, makes no sense in many circumstances. For example, in biotechnology, the “way” part of the test – how a particular result is accomplished – may be undisclosed in the patent and not even known to the inventor.¹³⁴ Furthermore, requiring a similarity in the “way” may serve as a complete bar against unforeseeable, after arising technology.¹³⁵ The U.S. Federal Circuit, in part founded to help provide some uniformity to national patent law, has repeatedly declined to define any particular formula to measure equivalence.¹³⁶

The principle of interchangeability is recognized under U.S. law as relevant to the equivalence inquiry. The Supreme Court stated that one key aspect of the test for equivalency is interchangeability, “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.”¹³⁷ The Federal Circuit has gone so far as to say, “known interchangeability is often synonymous with equivalence.”¹³⁸ Hesitancy of the U.S. to declare interchangeability as the sole test for equivalence may be due to the difficulty of the test. Interchangeability is a fact intensive judgment call.¹³⁹ In virtually every case, experts will likely be found to testify on both sides of the issue. Some accuse the Federal Circuit of ruling based upon subjective judgment, although it purports to apply an objective rule.¹⁴⁰

¹²⁹ *Id.* at 25 (citing *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 609 (1950)).

¹³⁰ *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 608 (1950).

¹³¹ *Weston*, *supra* note 65, at 43-44.

¹³² *Hilton Davis Chemical Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1518 (Fed. Cir. 1995) (rev'd on other grounds, *Warner-Jenkinson*, 520 U.S. 17 (1997)).

¹³³ *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929).

¹³⁴ *Lang*, *supra* note 81, at 471.

¹³⁵ Raj S. Davé & Martin J. Adelman, *Unforeseeability – The Touchstone of the Doctrine of Equivalents in the United States* 10-11, Presented at the AIPLA Annual Meeting, Oct. 14, 2004, Washington DC.

¹³⁶ *Hilton Davis*, 62 F.3d at 1518.

¹³⁷ *Warner-Jenkinson*, 520 U.S. 17 at 25.

¹³⁸ *Litton Sys. v. Honeywell, Inc.*, 140 F.3d 1449, 1465 (Fed. Cir. 1998).

¹³⁹ *Leggett & Platt, Inc. v. Hickory Springs Mfg. Co.*, 285 F.3d 1353, 1357 (Fed. Cir. 2002).

¹⁴⁰ *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 594 (Plager, J., concurring).

B. *Japan: Known Interchangeability – Check It Twice*

Japan adopted an interchangeability test as the test for equivalence. As announced in the *Ball Spline*¹⁴¹ case, the test is whether the “objective of the patented invention can be attained even if the elements are replaced with the structures in the accused product, and thus the accused product results in the identical functions and effects as the patented invention.”¹⁴² This test, somewhat similar to the U.S. function-way-result test, focuses on the principles of operation of the invention.

Japan has a second portion of the doctrine of equivalents test referred to as the “essential part” requirement, which is essentially a second look at the interchangeability requirement. The test requires that the substituted part is “not an essential portion of the patented invention.”¹⁴³ Japanese scholars disagree about how the essential part requirement maps to other jurisdictions.¹⁴⁴ A lack of description in the *Ball Spline* decision introducing the test failed to clarify this point.¹⁴⁵ However, the essential part requirement was clarified in a later case:

[E]ssential elements are those that produce the function and result unique to the patented invention; in other words, those elements which if replaced would result in a technical idea different from that of the patented invention . . . the unique function and result must be those that were not accomplished by the prior art.¹⁴⁶

The essential part requirement therefore forces the interchangeability test to take into account the principle of operation of the invention. The Japanese Supreme Court noted that the essential part requirement largely overlaps the interchangeability test.¹⁴⁷ Hence, the essential part requirement will automatically be met if the interchangeability requirement is met.¹⁴⁸ It is interesting to note that the language of the Japanese test is very similar to that of the U.S. function-way-result test, with the “way” part of the test omitted, thus avoiding the objections raised against the “way” part of U.S. test.¹⁴⁹

¹⁴¹ *Tsubakimoto Seiko Co. v. THK Co.* (Sup. Ct. Feb 24, 1998), translated in Takenaka, *Doctrine Affirmed*, *supra* note 29.

¹⁴² Takenaka, *Doctrine Affirmed*, *supra* note 29.

¹⁴³ *Id.*

¹⁴⁴ Yukio Nagasawa, *The Recent Changes of the Doctrine of Equivalents in Japan – Essential Part of the Invention (1st Requirement)* 7-12, Presented at the AIPLA Annual Meeting, Oct. 14, 2004, Washington DC.

¹⁴⁵ *Id.*

¹⁴⁶ Toskiho Takenaka, *The Doctrine of Equivalents after the Supreme Court “Ball Spline” Decision*, 5 CASRIP NEWSLETTER (Winter/Spring 1999).

¹⁴⁷ *Id.*

¹⁴⁸ Toshiko Takenaka, *Osaka District Court Found Infringement Under the Doctrine of Equivalents*, 6 CASRIP NEWSLETTER (Summer 1999). One commentator views the essential element test as equivalent to the “way” part of the U.S. function-way-result test. John Richards, *Recent Patent Law Developments in Asia*, 7 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 599, 627 (1997).

¹⁴⁹ See *supra* notes 134-135 and accompanying text.

C. *E.U. Follows Japan: Known Interchangeability Is The Measure of Equivalence*

Jurisprudence in the U.K. has been less confused than in the U.S., but no less controversial.¹⁵⁰ New rules for claim interpretation under the EPC were announced in *Catnic Components Ltd. v. Hill & Smith Ltd.*¹⁵¹ The *Catnic* test includes asking “does the variant have a material effect upon the way the invention works.”¹⁵² As for the U.S., the focus is on how the substitution of an element would affect the operation of the invention. The words used in the claim, rather than having a narrow technical meaning, may be interpreted figuratively and are deemed characteristics, attributes, genus, or species of the term used.¹⁵³ Thus, interchangeability is determined by whether one skilled in the art and “told of both the invention and the variant,” would recognize the interchangeability of the elements at issue.¹⁵⁴

Historically, Germany interpreted patents broadly, and thus included interchangeable elements within the scope of a patent.¹⁵⁵ In the German counterpart to the U.K. *Improver* case, the court adopted a modified version of the *Catnic* analysis into German law.¹⁵⁶ The test for interchangeability is whether the substituted part “has identical technical effect.”¹⁵⁷ As for Japan and the U.K., the German focus is on the objective of the invention. Hence, Germany has harmonized with the U.K. on the use of interchangeability as a test for equivalence, and agreed with the U.K. court on analysis of the *Epilady* case under this rule.¹⁵⁸

V. Disputes Over Timing for Known Interchangeability

When equivalence is decided on the basis of known interchangeability, the question is at what time should the interchangeability have been known to one skilled in the art. Although there is international agreement that knowledge of interchangeability should be considered at some particular point in time, there is little agreement on what the proper time should be.

A. *U.S. and Japan: Patent Scope Expands as Knowledge Advances*

The U.S. considers interchangeable elements to encompass those elements known as being interchangeable at the time of infringement or before.¹⁵⁹ Accordingly, the scope of equivalent elements may increase as new equivalent elements are developed or discovered after

¹⁵⁰ See Jonathon D. C. Turner, *Purposive Construction: Seven Reasons Why Catnic is Wrong*, [1999] E.I.P.R. 531; Mario Franzosi, *In Defence of Catnic*, [2000] E.I.P.R. 242.

¹⁵¹ [1982] R.P.C. 183 (H.L. 1980).

¹⁵² *Id.* at 242. Again, it has been noted that looking at the “way” may be inappropriate for some fields, such as biotechnology. Pumfrey, *supra* note 38, at 9.

¹⁵³ Pumfrey, *supra* note 38, at 6.

¹⁵⁴ *Improver Corp. v. Remington Consumer Prods. Ltd.*, [1990] F.S.R. 181, 192 (Pat. Ct. 1989).

¹⁵⁵ Weston, *supra* note 65, at 55.

¹⁵⁶ Meier-Beck, *supra* note 68, at 6.

¹⁵⁷ *Improver Corp. v. Remington Products Inc.*, [2002] G.R.U.R. 515, translated in 24 INT’L REV. OF INDUS. PROP. & COPYRIGHT LAW 838, 842 (this *Bundesgerichtshof* (German Supreme Court) case is also referred to as *Schneidmesser I* (Cutting Blade I)).

¹⁵⁸ Hatter, *supra* note 10, at 486-487. The differing outcome between the U.K. and German cases is a result of the U.K. court concluding that the inventor intended a claim term to be given a strict interpretation and thus disclaimed any equivalents. See *infra* Part IV.C.

¹⁵⁹ *Warner-Jenkinson Inc., v. Hilton Davis Chemical Co.*, 520 U.S. 17, 37 (1997).

the filing of the patent. The U.S. approach serves to protect an inventor from unforeseen (and unforeseeable) developments in technology.¹⁶⁰ Under U.S. law, this may allow a patentee to block those who improve upon his invention, providing a greater incentive for innovation but less benefit to the public.¹⁶¹ This approach also allows the scope of patent protection to grow with time as new equivalent elements are invented.

The U.S. limits this growth in patent scope by the reverse doctrine of equivalents. The reverse doctrine of equivalents holds that an accused device does not infringe (even when the claims literally read on the device) if the improvement differs so far in principle from the original invention that it functions in a substantially different way.¹⁶²

Unfortunately, the U.S. may be moving away from including foreseeable equivalents known at the time of filing within the scope of patents.¹⁶³ Judge Rader argues that equivalents should only encompass unforeseeable advances, since a patentee is expected to draft claims which cover all known equivalents at the time of filing.¹⁶⁴ Despite this suggestion, current doctrine of equivalents law permits infringement where substitutes were known at the time of filing.¹⁶⁵ However, this practice is severely limited under U.S. practice of “prosecution history estoppel.”¹⁶⁶

Japan follows the lead of the U.S. and allows equivalents where “[a] person with ordinary skill in the field of the patented invention would have readily conceived the interchangeability between the claimed portion and a replaced structure in the accused product as of the time of exploitation, such as the manufacturer of the accused product by the accused infringer.”¹⁶⁷ Hence, Japan also recognizes the policy of protecting inventors from after-developed technology that is used to exploit the teachings of the patent.

B. *E.U.: Fixed Protection Based on Filing or Priority Date*

In contrast to the practice of both the U.S. and Japan, the U.K. limits equivalents to those known on the date of publication of the patent.¹⁶⁸ Germany is even stricter, limiting equivalents

¹⁶⁰ Lemley, *supra* note 84, at 1005 (citing *Hughes Aircraft Co. v. United States*, 757 F.2d 1351 (Fed. Cir. 1983)).

¹⁶¹ Robert P. Merges, *Rent Control in the Patent District: Observations on the Grady-Alexander Thesis*, 78 VA. L. REV. 359, 362-363 (1992); *See also* Toshiko Takenaka, *Doctrine of Equivalents After Hilton Davis: A Comparative Law Analysis*, 22 RUTGERS COMPUTER & TECH. L.J. 479, 516-519 (1996) (describing various views on proper protection of pioneering inventions) [hereinafter Takenaka, *Comparative*].

¹⁶² *Graver Tank & Mfg. Co., Inc. v. Linde Air Prods. Co.*, 339 U.S. 605, 608-609 (1950); *See also Dolly Inc. v. Spalding Inc.*, 16 F.3d 394, 400 (Fed. Cir. 1994) (stating no infringement under doctrine of equivalents when invention operates in different manner); Laura A. Handley, *Refining the Graver Tank Analysis with Hypothetical Claims: A Biotechnology Exemplar*, 5 HARV. J. LAW & TEC 31, 40-41 (1991) (describing Federal Circuit comments on reverse doctrine of equivalents since *Graver Tank*).

¹⁶³ *See infra* Part VI.A.

¹⁶⁴ *Johnson & Johnson Assoc. v. R.E. Service Co.*, 285 F.3d 1046, 1056-1058 (Fed. Cir. 2002) (Rader, J. concurring).

¹⁶⁵ *See Litton Sys. v. Honeywell, Inc.*, 140 F.3d 1449 (Fed. Cir. 1998).

¹⁶⁶ *See infra* Part VI.A.

¹⁶⁷ Takenaka, *Doctrine Affirmed*, *supra* note 29.

¹⁶⁸ *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1982] R.P.C. 183, 242 (H.L. 1980).

to those known on the priority date of the patent.¹⁶⁹ Both of these approaches provide less protection to the patentee than the approaches of the U.S. or Japan, since other inventors are free to develop improvements to the patented device as long as the improvements use previously unknown substitutes. These policies do, however, better serve the principles of notice than the U.S. policy, since the available range of equivalents is fixed at a certain point in time.¹⁷⁰

C. *Resolving the Disharmony*

The U.S. and Japan law allowing the scope of equivalents to expand with time contrasts starkly to the E.U. law limiting equivalents to those known before certain cutoff dates. This difference stems from a divergent view on how important it is to protect inventors against new technologies.¹⁷¹ There may, however, be more common ground here than it initially appears. The U.S. limits coverage of future-developed equivalents under the reverse doctrine of equivalents by looking to the principles of operation of the invention.¹⁷² If the principle of operation is changed too much, there is no infringement. This places a limit on how far claims can expand to cover unforeseen equivalents. The U.S. reverse doctrine of equivalents is, however, largely a restating of the interchangeability test in language that would be familiar in the E.U. and Japan.¹⁷³ Hence, were the U.S. to adopt the interchangeability test as the sole test for equivalence, it would align the U.S. with Japan and the E.U. and largely eliminate the need for separate reverse doctrine of equivalents analysis in U.S. cases. Additionally, the E.U. could recognize that the interchangeability test puts a significant limit on claim scope expansion to unforeseen equivalents. Thus the E.U. could eliminate the cutoff date for requiring knowledge of interchangeability and align itself with the U.S. and Japan. Although harmonization in this manner could significantly reduce confusion, it would likely have relatively little effect on case outcomes.

VI. Agreed: Claims Cannot Be Infringed By Disclaimed Embodiments

The doctrine of equivalence is limited in application by two major principles. First, claims are not infringed by disclaimed embodiments. Second, claims cannot be infringed by embodiments known in the prior art.

A. *U.S. Focus on Prosecution History Estoppel*

The principle that a patentee can disclaim embodiments was recognized in the U.S. at least as early as *Winans*.¹⁷⁴ The Supreme Court stated that “the patentee may so restrict his claim as to cover less than what he invented, or may limit it to one particular form of machine, excluding all other forms, though they also embody his invention.”¹⁷⁵ In other words, if the

¹⁶⁹ Meier-Beck, *supra* note 68, at 7. The priority date of a patent may predate the filing date when the patent claims the benefit of an earlier patent filing under various national laws and international treaties. *See, e.g.*, Paris Convention, *supra* note 42, art. 4.

¹⁷⁰ *See Takenaka, Comparative, supra* note 160, at 501.

¹⁷¹ *See supra* Part II.A.

¹⁷² *See supra* note 162 and accompanying text.

¹⁷³ *See supra* Part IV.B-C.

¹⁷⁴ *Winans v. Denmead*, 56 U.S. 330 (1854).

¹⁷⁵ *Id.* at 341.

patentee writes the claim to exclude something disclosed in specification, it is dedicated to the public, and thus becomes part of the public domain. This rule was restated recently:

[W]hen a patent drafter discloses but declines to claim subject matter ... this action dedicates that unclaimed subject matter to the public. Application of the doctrine of equivalents to recapture subject matter deliberately left unclaimed would “conflict with the primacy of the claims in defining the scope of the patentee’s exclusive right.”¹⁷⁶

Application of this principle is recognized in the U.S. doctrine of prosecution history estoppel. Under this doctrine, when a patentee amends a claim element to narrow the scope of the claim (typically to distinguish the invention over the prior art) the patentee is estopped from asserting that known equivalents outside the literal language of the claim element should be held within the scope of the amended claim.¹⁷⁷ The Supreme Court reasoned that the precise language of the element at issue undercuts the principle that language is an imprecise vehicle to describe the invention.¹⁷⁸ The Court stated that “the prosecution history established that the inventor . . . knew the words for both the broader and narrower claim, and affirmatively chose the latter.”¹⁷⁹ “[T]he patentee . . . may be expected to draft claims encompassing readily known equivalents,”¹⁸⁰ hence the estoppel excludes infringement by equivalents of known interchangeability. The policy for protecting against unforeseeable technology developments is therefore not applicable.¹⁸¹ The doctrine of equivalents does, however, remain available for unforeseeable equivalents.¹⁸² Prosecution history estoppel therefore serves to dedicate known equivalents to the public.¹⁸³

Some critics see the U.S. prosecution history estoppel rule as overly harsh.¹⁸⁴ Most U.S. patents are amended during prosecution to overcome prior art rejections, resulting in the application of prosecution history estoppel.¹⁸⁵ This in effect excludes equivalents known at the application filing date from the scope of patent infringement.¹⁸⁶ Such a result completely nullifies the first policy reason for the doctrine of equivalents, the imperfection of language. As noted by Judge Rader in a concurring opinion,

A foreseeability bar thus places a premium on claim drafting and enhances the notice function of claims. To restate, if one of ordinary skill in the relevant art would reasonably anticipate ways to evade the literal claim language, the patent applicant has an obligation to cast its claims to provide notice of that coverage. In other words, the patentee has an obligation to draft claims that capture all reasonably foreseeable ways to practice the

¹⁷⁶ *Johnson & Johnson Assoc. v. R.E. Service Co.*, 285 F.3d 1046, 1054 (Fed. Cir. 2002) (citation omitted).

¹⁷⁷ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 733-734 (2002).

¹⁷⁸ *Id.* at 734.

¹⁷⁹ *Id.* at 734-735.

¹⁸⁰ *Id.* at 740.

¹⁸¹ *Id.* at 733-734.

¹⁸² *Id.* at 740-741.

¹⁸³ Lang, *supra* note 81, at 443. Lang argues that prosecution history estoppel is better viewed as an equitable doctrine or exhaustion of administrative remedies. *Id.* at 443-444.

¹⁸⁴ Takenaka, *Harmonizing*, *supra* note 123, at 263.

¹⁸⁵ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 598 (Fed. Cir. 2000) (Michel, J., dissenting).

¹⁸⁶ *Id.*

invention. The doctrine of equivalents would not rescue a claim drafter who does not provide such notice. Foreseeability thus places a premium on notice while reserving a limited role for the protective function of the doctrine of equivalents.¹⁸⁷

Fortunately, this is not the law because the Supreme Court and Federal Circuit have not adopted a complete bar to foreseeable equivalents; equivalents include all known equivalents including those known at the time of filing.¹⁸⁸

B. *Japan: Reluctantly Adopts the U.S. Estoppel Rule*

Japan had initial misgivings about the U.S. application of prosecution history estoppel and thus declined to codify it during revisions of its patent act to meet the requirements of the TRIPS agreement.¹⁸⁹ The doctrine was, however, eventually adopted by the Osaka High Court,¹⁹⁰ and later confirmed in a different case by the Japanese Supreme Court.¹⁹¹ The Court tied the estoppel doctrine to the notice policy, stating that “if the patentee were allowed to act one way and assert the opposite later on, it would unreasonably invade the interest of third parties who believed the patentee’s previous acts.”¹⁹² Hence, Japan will apply estoppel when the patentee admits or acts as if terms are outside the scope of the claim.¹⁹³

C. *E.U.: Focusing on Claim Language*

In contrast to the U.S., the U.K. does not recognize the doctrine of prosecution history estoppel.¹⁹⁴ The U.K. looks to whether the patentee indicated in the claim language that certain embodiments are clearly outside the scope of the claim. For example, part of the *Catnic* test was restated in *Improver* as “would the reader skilled in the art . . . have understood from language of the claim that the patentee intended that strict compliance with the primary meaning (of the claim language) was an essential requirement of the invention.”¹⁹⁵

Germany does not directly address either disclaimer/dedication or prosecution history estoppel.¹⁹⁶ In the past, Germany determined the “expressed intentions of the applicant and the patent office” by looking at the patentee’s declarations during prosecution, but this view was later rejected.¹⁹⁷ It appears the current view is that Art. 69 of the EPC prohibits use of

¹⁸⁷ *Johnson & Johnston Assocs. v. R.E. Serv. Co.*, 285 F.3d 1046, 1057 (Fed. Cir. 2002) (Rader, J. Concurring).

¹⁸⁸ See *Vulcan Eng’g Co. v. FATA Aluminum, Inc.*, 278 F.3d 1366, 1374 (Fed. Cir. 2002) (citing *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 36 (1997)).

¹⁸⁹ Takenaka, *Japan Revisions*, *supra* note 39.

¹⁹⁰ Toshiko Takenaka, *New Policy In Interpreting Japanese Patents: Osaka High Court Affirming Infringement of Genentech’s t-PA Patents Under the Doctrine of Equivalents*, 3 CASRIP NEWSLETTER (1996).

¹⁹¹ Takenaka, *Doctrine Affirmed*, *supra* note 29.

¹⁹² Yoichiro Kawashino & Toshiko Takenaka, *File Wrapper Estoppel and the Doctrine of Equivalents in Japanese Courts*, CASRIP NEWSLETTER (2000).

¹⁹³ *Id.*

¹⁹⁴ See John Lambert & Alex Khan, *Case Comment: Merck & Co. v Generics (UK) Ltd.*, [2004] E.I.P.R. 361, 364-365. Provisions for prosecution history estoppel were originally proposed for the revision of the EPC (to take force 2006-2007), but were dropped. *Id.*

¹⁹⁵ *Improver Corp. v. Remington Consumer Products Ltd.*, [1990] F.S.R. 181, 189 (Pat. Ct. 1989).

¹⁹⁶ Meier-Beck, *supra* note 68, at 8.

¹⁹⁷ Weston, *supra* note 65, at 52.

extraneous material (e.g. prosecution history) because Art. 69 does not list any extraneous material as a means for interpretation.¹⁹⁸ There is also a view that prosecution history estoppel largely overlaps limitations on patent claim scope set by the prior art.¹⁹⁹

D. *Differences are Just Procedural Differences*

That a patentee should be estopped from attempting to enforce rights he could not or did not attempt to legitimately obtain before a patent office seems uncontroversial. So the basic principle that disclaimed embodiments should not be within the scope of the doctrine of equivalents is held in common. International differences can be viewed as procedural rules for application of the doctrine. The E.U. limits the investigation to the specific claim language arrived at by the prosecution process, while the U.S. and Japan are willing to dig into the history of the prosecution process. Extensive debate has raged over which approach is better.²⁰⁰ Given the differences in patent examination between different countries, uniform application of prosecution history estoppel seems problematic. On the other hand, judicial changes in prosecution history estoppel at the U.S. Supreme Court seem unlikely, given the unanimous decision in *Festo*.²⁰¹ Resolving this difference may be very difficult.

VII. Well Settled: Embodiments in the Prior Art Cannot Infringe

The application of the doctrine of equivalents is also limited because a patent cannot be infringed by a device which is found in the prior art of the patent.²⁰² This doctrine is well-settled U.S. law.²⁰³ Since a patent could not be obtained which covers a prior art device (or obvious modifications of a prior art device), the prior art at the time of the patent filing thus limits the doctrine of equivalents.²⁰⁴ Otherwise, a patentee could obtain protection not legally available from the patent office.²⁰⁵

The principle that patent claims cannot be expanded under the doctrine of equivalents to read on the prior art is recognized, though rarely directly discussed, by the U.K. The lack of discussion may be a result of the traditionally narrow interpretation granted to claims by the U.K. In *Improver Corp. v. Remington Consumer Products Ltd.*, the prior art limitation argument was raised by the defendants, but was not considered by the court because there was no infringement based on the disclaimer principle.²⁰⁶

¹⁹⁸ Meier-Beck, *supra* note 68, at 9. A more proper view, however, may be that the EPC neither allows nor disallows prosecution history estoppel in light of the inability of the member nations to agree on the subject. See Heath, *supra* note 38, at 35.

¹⁹⁹ Meier-Beck, *supra* note 68 at 9; See *infra* Part VII.

²⁰⁰ See Symposium, *Panel I: The End of Equivalents? Examining the Fallout from Festo*, 13 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 727. This debate has similar themes to the ongoing debate over the use of legislative history in statutory interpretation. See Morell E. Mullins, Sr., *Coming to Terms With Strict and Liberal Construction*, 64 ALB. L. REV. 9 (2000).

²⁰¹ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722 (2002).

²⁰² *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 870 (Fed. Cir. 1985).

²⁰³ *Interactive Pictures Corp. v. Infinite Pictures, Inc.* 274 F.3d 1371, 1380 (Fed. Cir. 2001).

²⁰⁴ *Streamfeeder v. Sure-Feed Systems, Inc.*, 175 F.3d 974, 982-983 (Fed. Cir. 1999).

²⁰⁵ *Wilson Sporting Goods*, 904 F.2d 677, 683-684 (Fed. Cir., 1990).

²⁰⁶ *Improver Corp. v. Remington Consumer Products Ltd.*, [1990] F.S.R. 181, 199 (Pat. Ct. 1989).

Generally, in Germany, you can not raise invalidity as a defense in an infringement trial; it must be raised in a separate nullity proceeding before the Federal Patent Court.²⁰⁷ However, when the court applies the doctrine of equivalents, prior art can be raised as an objection to expanding the claim scope such that the modified embodiment would be found or made obvious by the state of the art.²⁰⁸ This is referred to as the “*Formstein* objection” from the German Supreme Court case in which the objection was allowed.²⁰⁹ The analysis under the *Formstein* objection is very similar to analysis under U.S. law.²¹⁰

Japan also recognizes this principle, although it is stated in a slightly different way. To prove infringement under the doctrine of equivalents, the patentee must show “the accused product is novel and would not have been able to be conceived by one skilled as of the application time of the patented invention.”²¹¹ This is essentially the U.S. and German test, but restated as a positive, rather than a negative requirement.²¹² Hence, on this final principle we have international accord.

Conclusion: The Courts Play the Conductor’s Role

Despite the lack of treaty initiated harmonization, remarkable agreement on principles of claim interpretation has emerged through judicial decisions. Only a couple of major sticking points remain: substantively, the point in time at which knowledge of interchangeability must have existed,²¹³ and procedurally, whether prosecution history estoppel is a proper aspect of claim interpretation.²¹⁴ Treaty driven harmonization of detailed issues such as these has been overwhelmed by other disagreements, such as the first-to-invent versus first-to-file debate.²¹⁵

Perhaps resolution of the remaining disconnects in the doctrine of equivalents is best left to development under common law tradition. Academic tradition favors a free exchange of ideas, even across national borders. Courts look increasingly to foreign precedent, especially in developing new law and interpreting law under international treaty.²¹⁶ With increased access to foreign judicial decisions,²¹⁷ and increased international attendance at legal conferences, it should be no surprise that judges look to other jurisdictions’ jurisprudence to resolve the difficult

²⁰⁷ Weston, *supra* note 65 at 55.

²⁰⁸ Meier-Beck, *supra* note 68 at 8.

²⁰⁹ *Id.* (discussing case of *Formstein* “Moulded Curbstone”, [1986] G.R.U.R. 803, translated in 18 INT’L REV. INDUS. PROP. & COPYRIGHT L. 795 (1987)).

²¹⁰ Katherine E. White, *Festo: A Case Contravening the Convergence of Doctrine of Equivalents Jurisprudence in Germany, the United Kingdom, and the United States*, 8 MICH. TELECOMM. TECH. L. REV. 1, 23 (2001) (discussing overruled Federal Circuit decision in *Festo*).

²¹¹ Takenaka, *Doctrine Affirmed*, *supra* note 29.

²¹² *See Id.*

²¹³ *See supra* Part V.C.

²¹⁴ *See supra* Part VI.D.

²¹⁵ *See supra* note 16.

²¹⁶ *See* J. Harview Wilkinson III, *The Use of International Law in Judicial Decisions*, 27 HARV. J.L. & PUB. POL’Y 423, 423-24 (2004).

²¹⁷ Including, in a pinch, using free internet translation engines to examine foreign language materials.

balancing required by the conflicting policy tensions behind the doctrine of equivalents. The occasional unusual case even requires judges to apply foreign patent law in resolving disputes.²¹⁸

Judge-made common law can, as it already has, provide harmonization in the absence of international agreement and statutory modifications.²¹⁹ It is probably not reasonable to expect this process to be linear. Steps forward, backwards, and sideways will undoubtedly be taken. It has been noted that Japan and the U.S. seem to have come full circle in their claim interpreting, with the U.S. moving towards a more strict application similar to the traditional approach of Japan, while Japan has become more liberal adopting the former position of the U.S.²²⁰ It is not surprising this process has proceeded unevenly given that international treaties are subject to interpretation in local languages and Judges operate within different traditions and precedent.

The doctrine of equivalents is a particularly difficult area of law: “[e]ven judges cannot agree on its contours. Imagine the dilemma for lawyers! Pity lay jurors!”²²¹ “Even in regions having a common system, there can be very different views on how exactly this system is meant to work and how to interpret the laws applying to this system.”²²² We should hardly blame judges in different jurisdictions for not agreeing under circumstances where judges in the same jurisdiction may differ.²²³ Perhaps through the international market place of ideas, the best solutions to the policy dilemma underlying the doctrine of equivalents will emerge and eventually find its way into each of the national systems. Then, we will be able to say the orchestra is playing in tune.

²¹⁸ See e.g. *Celltech Chiroscience Ltd. v. Medimmune Inc.*, [2004] F.S.R. 3 (C.A. 2003) (U.K. court deciding infringement of U.S. patent under licensing agreement governed by U.K. law).

²¹⁹ Takenaka, *Harmonizing*, supra note 123, at 277.

²²⁰ Takenaka, *Harmonizing*, supra note 123, at 266.

²²¹ Michel, supra note 6, at 123.

²²² Meier-Beck, supra note 68, at 1.

²²³ Pumfrey, supra note 38, at 9.