

University of Pennsylvania Law Review

FOUNDED 1852

Formerly
American Law Register

Vol. 137

JANUARY 1989

No. 3

ARTICLES

THE DOCTRINE OF EQUIVALENTS IN PATENT LAW: QUESTIONS THAT *PENNWALT* DID NOT ANSWER

MARTIN J. ADELMAN[†] AND GARY L. FRANCIONE^{††}

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[†] Copyright © 1989 by Martin J. Adelman and Gary L. Francione. All rights reserved. Professor of Law, Wayne State University. A.B. 1958, M.S. 1959, J.D. 1962, University of Michigan.

^{††} Associate Professor of Law, University of Pennsylvania. B.A. 1976, University of Rochester; M.A. 1981, J.D. 1981, University of Virginia. Many thanks to Max R. Shulman, partner, Cravath, Swaine & Moore, Morris Weisbrot, partner, Davis, Markel & Edwards, and Theresa J. Macellaro, associate, Cravath, Swaine & Moore, for their helpful comments. We appreciate the extraordinary efforts of Ms. Elizabeth Tan and Mr. Woody Pinder, who generated innumerable drafts of our manuscript and never lost their equanimity.

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INTRODUCTION: UNCERTAINTY IN THE SCOPE OF PATENT CLAIMS

A patent represents a constitutionally sanctioned, limited monopoly over an invention granted by the government to an inventor.¹ For over a century, inventors have been required to specify with particularity those things claimed for patent protection "so that the public may know what they are prohibited from doing during the existence of the monopoly, and what they are to have at the end of the term, as a consideration for the grant."² This requirement of specificity prevents an

¹ U.S. CONST. art. I, § 8, cl. 8, provides that "Congress shall have Power . . . [t]o 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" Congress enacted the first patent statute in 1790. See 1 D. CHISUM, PATENTS § 1.01 (1987). The current statutes are codified at 35 U.S.C. §§ 1-376 (1982 & Supp. IV 1986).

² *Brooks v. Fiske*, 56 U.S. (15 How.) 212, 214-15 (1853); see also *McClain v. Ortmayer*, 141 U.S. 419, 424 (1891) ("The object of the patent law in requiring the patentee to 'particularly point out and distinctly claim the part, improvement or combination which he claims as his invention or discovery,' is not only to secure to him all to which he is entitled, but to apprise the public of what is still open to them.").

The enablement theory of patents is a second reason for requiring specificity. As part of the requirement for disclosure, a patent applicant must include in the patent specification "a written description of the invention, and of the manner and process of making and using it" in order to "enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." 35 U.S.C. § 112 (1982).

The patent statute enacted in 1793 required that "in setting forth the invention the description shall 'distinguish the same from all other things before known.'" Woodward, *Definiteness and Particularity in Patent Claims*, 46 MICH. L. REV. 755, 758

inventor from "practising upon the credulity or fears of other persons, by pretending that his invention was different from its ostensible objects."³

A patent claim usually consists of a preamble, a transition, and a body.⁴ The claim defines the invention for purposes of determining whether the invention is patentable⁵ and whether the patent is infringed, "that is, what constitutes the 'patented invention' which persons cannot make, use or sell without the authority of the patent owner."⁶

Under copyright law, the scope of the right against infringement is

(1948) (quoting Act of Feb. 21, 1793, ch. 11, § 3, 1 Stat. 318, 321 (repealed 1836)). A similar provision appeared in the original patent statute of 1790. *See id.* at 758 n.7 (quoting Act of Apr. 10, 1790, § 2, 1 Stat. 109, 110 (repealed 1793)). Some courts came to interpret the language of the 1793 statute as requiring inclusion of statements "more or less in the nature of a claim as part of the patent document." *Id.* at 758. In 1836, Congress codified the judicial interpretation requiring "claim" language. *See generally id.* at 758-60 (explaining that because of such judicial interpretation, the practice of appending statements of claim after the description of the invention's subject matter became so commonplace that the 1836 enactment was understood to be merely a codification of the common practice).

³ *Brooks*, 56 U.S. (15 How.) at 215.

⁴ A preamble is an introductory phrase that "may summarize the invention, its relation to the prior art, or its intended use or properties." 2 D. CHISUM, *supra* note 1, § 8.06[1][b], at 8-83. The transition is "a phrase connecting the preamble to the body of the claim." *Id.* at 8-84. The body of the claim is "the recitation or listing of the elements and limitations which define the product or process to be encompassed within the patent monopoly." *Id.* at 8-87.

⁵ The conditions of patentability are: (1) eligible subject matter; (2) originality; (3) novelty; (4) utility; and (5) non-obviousness. In addition, an inventor must comply with rules requiring inventors to file for patents in a timely fashion and disclose adequately their contributions to the art. *See generally* 1 & 2 D. CHISUM, *supra* note 1 (discussing the essential elements of a claim of patentability).

⁶ 2 D. CHISUM, *supra* note 1, § 8.01, at 8-3. If the Patent and Trademark Office decides that an application meets the standards of patentability, it grants a patent for seventeen years subject to up to a five year renewal under certain specialized circumstances. *See* 35 U.S.C. § 154 (1982); *id.* § 155A (Supp. IV 1986). The monopoly granted under the patent law is a "negative" monopoly because the grant of a patent does not necessarily mean that the holder can actually make, use, or sell the invention for the period of the patent. *See* 4 D. CHISUM, *supra* note 1, § 16.02[1]. In some instances, use of the patented invention may necessarily infringe another's patent, such as when a patent represents an improvement, albeit a patentable improvement, of another patented invention. The patent holder may, however, use the patent to exclude others from making, using, or selling the invention during the lifetime of the patent. *See id.* The Federal Circuit has denied that patents create monopolies, most likely because the word "monopoly" carries a pejorative connotation. *See Schenck v. Nortron Corp.*, 713 F.2d 782, 784, 786 n.3 (Fed. Cir. 1983). Patents *do* create monopolies, however, because the first inventor obtains total control of the invention, even against a subsequent independent inventor. *See Roberts v. Sears, Roebuck & Co.*, 723 F.2d 1324, 1345 (7th Cir. 1983) (Posner, J., concurring and dissenting); *cf. infra* notes 139-52 and accompanying text (noting that the characteristics that make a patent a monopoly are not present in copyright law).

determined through litigation.⁷ Under patent law, however, the scope of this right is determined through a two-step process that blocks ad hoc assessments in patent infringement suits. First, a patent application must contain a specification that concludes "with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."⁸ Second, the Patent and Trademark Office (PTO) must determine patentability in light of the "metes and bounds" set out by the claims.⁹ This second step requires, at least in theory, rigorous scrutiny by the PTO before any claim is granted.¹⁰

Since 1982, the Court of Appeals for the Federal Circuit has dominated the development of the patent system.¹¹ In the first few years of

⁷ The 1976 Copyright Act provides that copyright protection begins at the moment the work is "fixed in any tangible medium of expression." 17 U.S.C. § 102(a) (1982). Registration of the copyrighted work with the Register of Copyright is not necessary, although actual or attempted registration is a prerequisite to bringing a suit for infringement of the copyright. *See id.* § 411. The Register of Copyright does not engage in any rigorous analysis as an antecedent to registration, and the scope of copyright is necessarily decided after the copyright comes into existence (at the time of fixation in a tangible medium) and after registration. The administrative action involved in granting a copyright does nothing to determine the scope of copyright. *See generally* 2 M. NIMMER, NIMMER ON COPYRIGHTS § 7.16[A]-[G] (1984) (discussing the operations of the Copyright Office).

There are rules, however, that are intended to determine the scope of copyrights. For example, the statute provides that "[i]n no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." 17 U.S.C. § 102(b) (1982). A dispute about whether a particular work uses an unprotectable idea, and thus does not infringe, or instead uses protectable expression, and thus does infringe, will generally be determined on an ad hoc basis in litigation. For a discussion of the ad hoc nature of copyright infringement suits, see Francione, *Facing The Nation: The Standards for Copyright, Infringement, and Fair Use of Factual Works*, 134 U. PA. L. REV. 519, 539 (1986).

⁸ 35 U.S.C. § 112 (1982).

⁹ *See* Adelman, *The New World of Patents Created by the Court of Appeals for the Federal Circuit*, 20 U. MICH. J.L. REF. 979, 994-95 (1987) [hereinafter Adelman, *Federal Circuit*].

¹⁰ *See* 3 D. CHISUM, *supra* note 1, § 11.03 (describing the procedure of examination and prosecution used by the PTO to determine whether "the applicant is entitled to a patent under law"). Claims are employed today in all major patent systems. *See* M. EMPER, *THE GRANTING OF EUROPEAN PATENTS* 197 (1974) ("[P]atent claims appear to be required in all examining countries."). For example, France, which until 1968 functioned under a system that eschewed claims, has also adopted a system in which claims are granted by the patent office. *See* Mathely, *View of a French Advocate*, in *PATENT CLAIM DRAFTING AND CLAIM INTERPRETATION* 169, 169 (J. Kemp ed. 1983).

¹¹ The Federal Circuit, which has exclusive jurisdiction of all appeals in patent cases, was created by the Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, § 126, 96 Stat. 25, 37 (codified as amended at 28 U.S.C. § 1295 (1982 & Supp. IV 1986)). This Act was the culmination of years of study of possible methods of alleviating the overcrowded dockets of the Supreme Court and the Federal Courts of Ap-

its existence, the Federal Circuit shifted the determination of the scope of patent rights away from the administrative setting of the PTO through its routine use of the doctrine of equivalents. According to this doctrine, judges and juries may find infringement even when the defendant's device or process does not infringe the literal language of the patent claims.¹² Increasingly, the scope of patent rights was being determined by judge and jury decisions that were not firmly rooted in the language of patent claims. Recently, however, in *Pennwalt Corp. v. Durand-Wayland, Inc.*,¹³ the Federal Circuit, sitting in banc, showed its awareness that the central role of claims in determining the question of infringement is eroded by use of the doctrine of equivalents.¹⁴

The specific equivalents issue that led to the extraordinary set of *Pennwalt* opinions¹⁵ was whether to apply an "element-by-element" approach or a "claim as a whole" (or "entirety") approach. The "element-by-element" approach requires an equivalent for each claim limitation or element in order for an infringement to be found.¹⁶ The "en-

peals. The Federal Circuit replaced the Court of Customs and Patent Appeals and assumed the appellate jurisdiction of the Court of Claims. Since its establishment, the Federal Circuit has been primarily responsible for the development of patent law; the Supreme Court rarely hears appeals of Federal Circuit patent decisions. See Adelman, *Federal Circuit*, *supra* note 9, at 986-87. Adelman provides a general discussion of the Federal Circuit and its influence on the administration of the patent system. See *id.*

¹² See *infra* notes 27-29 and accompanying text.

¹³ 833 F.2d 931 (Fed. Cir. 1987) (in banc), *cert. denied*, 108 S. Ct. 1226 (1988). We use the term "in banc" throughout this Article because this is the term that the Federal Circuit uses to describe itself when it sits as a whole.

¹⁴ See *id.* at 934-35; see also *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1532-33 & n.8 (Fed. Cir. 1987) (noting that the Federal Circuit panel has a restrictive view of the doctrine of equivalents). The first intimation that the Federal Circuit was beginning to reconsider its routine use of the doctrine of equivalents came in Judge Newman's opinion in the complex and much discussed *Texas Instruments* case. See *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1572 (Fed. Cir. 1986) (holding that the doctrine of equivalents "represents an exception to the requirement that the claims define the metes and bounds of the patent protection"). For a discussion of *Texas Instruments*, see 2 D. DUNNER, J. GAMBRELL, M. ADELMAN & C. LIPSEY, *PATENT LAW PERSPECTIVES* § 3.3[2], at 3-24.3 n.21 (2d ed. 1982).

¹⁵ The case was originally argued before a panel consisting of Judges Bennett, Cowen, and Nies, but the court decided the case in banc upon the suggestion of an active judge who was not on the original panel. See *Pennwalt*, 833 F.2d at 932 n.**.

¹⁶ Some panels of the Federal Circuit had adopted the "element-by-element" approach. See, e.g., *Martin v. Barber*, 755 F.2d 1564, 1568 (Fed. Cir. 1985) ("[W]here an accused device avoids literal infringement by changing an element of a claimed invention, it is appropriate to consider, in assessing equivalence, whether the changed element operates in substantially the same way as the claimed element in fulfilling the 'substantially same way' prong of the 'function, way, and result' test of equivalence."); *Lemelson v. United States*, 752 F.2d 1538, 1551 (Fed. Cir. 1985) ("It is also well settled that each element of a claim is material and essential, and that in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device."); *ACS Hosp. Sys., Inc. v. Montefiore*

tirety" approach, however, requires only an equivalence between the claimed invention and the accused device considered as "wholes" or in their "entireties."¹⁷

Pennwalt involved a patent on an apparatus that sorted items, such as fruit, by color or weight. In its lawsuit, Pennwalt claimed that Durand-Wayland's sorting apparatus infringed Pennwalt's patent. The Pennwalt case produced a seven-judge majority¹⁸ and a vigorous four-judge dissent.¹⁹ In addition, one judge who joined in the majority added a separate writing styled "additional views,"²⁰ and one judge who joined the dissent added a separate writing styled "commentary."²¹ The majority held that the Durand-Wayland sorter did not infringe on the Pennwalt patent because Pennwalt failed to prove that the accused device had the equivalent of each and every element in the Pennwalt patent.²² Through its explicit and unequivocal adoption of the element-by-element approach, the Federal Circuit thought that the *Pennwalt* case represented a major step in the effort to clarify the doctrine of equivalents.²³

Unfortunately, *Pennwalt* did very little to resolve the ambiguities created by the doctrine. In many respects, the choice of an element-by-element or entirety approach has little consequence for a fact-finder seeking guidance in answering the real question at issue: What is an

Hosp., 732 F.2d 1572, 1576 (Fed. Cir. 1984) (criticizing the district court for not attempting to determine the differences between the elements of the inventions).

¹⁷ Some panels of the Federal Circuit had adopted the "entirety" approach. See, e.g., *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1575 (Fed. Cir. 1985) (stating that the fact finder must determine "whether the entirety of the accused device or process is so 'substantially the same thing, used in substantially the same way, to achieve substantially the same result' as to fall within that range" of equivalents (emphasis added) (quoting *Graver Tank & Mfg. Corp. v. Linde Air Prods. Co.*, 339 U.S. 605, 610 (1950))). This Article does not discuss the tension in court decisions between the element-by-element approach and the entirety approach. Both approaches are reflected in the case law. See Harris, *Three Ambiguities of the Doctrine of Equivalents in the Federal Circuit*, 69 J. PAT. & TRADEMARKS OFF. SOC'Y 91, 104 (1987) ("Present CAFC case law thus offers significant support for both the element-by-element and invention-as-a-whole approaches to doctrine of equivalents analysis . . ."). This Article accepts, however, for present purposes that the in banc Federal Circuit has adopted the element-by-element approach.

¹⁸ Judge Bissell wrote the majority opinion and was joined by Chief Judge Markey and Judges Friedman, Rich, Davis, Nies, and Archer. See *Pennwalt*, 833 F.2d at 932.

¹⁹ Judge Bennett wrote the dissenting opinion and was joined by Judges Cowen, Smith, and Newman. See *id.*

²⁰ Judge Nies filed the "additional views." See *id.*

²¹ Judge Newman filed the "commentary." See *id.*

²² See *id.* at 935.

²³ An early commentator agreed. See Nieman, *The Federal Circuit Resolves Ambiguities in the Doctrine of Equivalents*, 70 J. PAT. & TRADEMARK OFF. SOC'Y 153, 153 (1988).

“equivalent”? Until the Federal Circuit resolves with some greater degree of specificity the ambit of the doctrine of equivalents, it will not really matter which “version” of the doctrine is used.²⁴ If the doctrine has a very broad scope of application, then it is more likely that an equivalent will be found whether the doctrine is applied on an element-by-element basis or an entirety basis. Similarly, if the doctrine has a very narrow scope of application, then it is more likely that an equivalent will not be found. The *Pennwalt* case avoids the uncertainty created by the doctrine of equivalents because it answers the wrong question. To compound the uncertainty, the Federal Circuit in *Pennwalt* indicated that it is prepared to allow the jury to decide in virtually every case whether the doctrine of equivalents applied.²⁵

Part I of this Article provides a brief introduction to the role of the doctrine of equivalents in patent law. Part II reviews the *Pennwalt* decision and argues that it did not substantially reduce the tensions in patent law stemming from the doctrine of equivalents. Part III canvasses the modern articulation of the doctrine of equivalents and argues that the doctrine has become the patent law analogue to the “substantial similarity” concept in copyright law. After a review of the primary uses and legitimacy of the uses of the doctrine of equivalents, Part IV proposes that there is, at best, a very limited need for the doctrine of equivalents. Furthermore, most of the concerns that animate the doctrine’s use may be met by solutions that present fewer difficulties.

I. THE ROLE OF THE DOCTRINE OF EQUIVALENTS

A patent infringement can be established in one of two ways. First, if each element and limitation of a patent claim, properly construed, is found in the accused device, the claim is said to “read on” the accused device, and there is literal infringement.²⁶ If there is no literal infringement, infringement may still be found by application of the

²⁴ In a limited number of instances, there will be a difference in result depending upon which method is used. This difference occurs when there is no element in the accused device that functions in the same or substantially the same way as the claimed device, but the accused device functions substantially the same way overall as the claimed device. Of the numerous doctrine of equivalents cases decided by the Federal Circuit since its inception, however, only two results may have depended on the *Pennwalt* outcome. See *Spectra Corp. v. Lutz*, 839 F.2d 1579, 1582 (Fed. Cir. 1988) (focusing on the function of each element rather than the presence of the element); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1363-64 (Fed. Cir. 1983) (noting that an element-by-element approach could have led to a different result).

²⁵ See *infra* notes 117-20 and accompanying text.

²⁶ See, e.g., *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1118 (Fed. Cir. 1985) (in banc) (finding literal infringement when the accused invention “reads directly, unequivocally, and word-for-word on [the claimed] structure”).

"doctrine of equivalents." Under this approach, which in its modern form is designed to prevent "fraud on a patent,"²⁷ a process or product may be held to infringe if it performs "substantially the same function in substantially the same way to give substantially the same result."²⁸ The doctrine of equivalents, if applied broadly, can eviscerate both the claiming system and the goal of providing notice to the public of the scope of a patent. The doctrine achieves these results by enlarging, in an unpredictable way, the scope of a patent beyond the boundaries claimed by the applicant in her prosecution of the patent before the PTO.²⁹

The doctrine of equivalents does not allow an unlimited expansion of patent claims, however. The doctrine is limited by the doctrine of prosecution history estoppel, which prevents a patentee from recapturing in court what was given up during the patent prosecution in order to secure patentability.³⁰ Thus, the record in the PTO is studied to

²⁷ See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950); see also *infra* notes 121-36 and accompanying text (discussing the *Graver Tank* decision).

²⁸ *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 869 (Fed. Cir. 1985). The Federal Circuit has also stated that the doctrine of equivalents test should be performance of "substantially the same function in substantially the same way to yield substantially the same result." *Martin v. Barber*, 755 F.2d 1564, 1567 (Fed. Cir. 1985). The court has also phrased the test to require "substantially the same thing, used in substantially the same way, to achieve substantially the same result." *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1575 (Fed. Cir. 1985). In another opinion, the Federal Circuit has phrased the "result" portion of the test as "same result" rather than as "substantially the same" result. See *Mannesmann Demag Corp. v. Engineered Metal Prods. Co.*, 793 F.2d 1279, 1283-84 (Fed. Cir. 1986). In some cases, the Federal Circuit has used both formulations. See *Lemelson v. United States*, 752 F.2d 1538, 1550, 1552 (Fed. Cir. 1985); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1361, 1366 (Fed. Cir. 1983). In *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888 (Fed. Cir.), *cert. denied*, 469 U.S. 857 (1984), the Federal Circuit had stated that "substantially the same result" rather than "same result" is the appropriate phrase. *Id.* at 901-02; see also *Harris, supra* note 17, at 92-96 (noting the ambiguity resulting from the varying uses of the word "substantially" in the doctrine of equivalents).

²⁹ *Great N. Corp. v. Davis Core & Pad Co.*, 782 F.2d 159 (Fed. Cir. 1986) stretched the claims to the breaking point. The Federal Circuit recognized that if it extended the claims under the doctrine of equivalents too far, it could destroy the peripheral claiming system. See *id.* at 166 ("[W]e hesitate to expand this doctrine [of equivalents] too far, to the point where patent counsel cannot rely at all on what the claims recite when advising on infringement . . .").

³⁰ See *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985) (noting that the doctrine "limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to claim allowance"). Prosecution history estoppel prevents a patent applicant from giving "to the claim the larger scope which it might have had without the amendments." *Smith v. Magic City Kennel Club, Inc.*, 282 U.S. 784, 790 (1931). For example, assume the following hypothetical, suggested by Max R. Shulman: (1) a patent applicant discloses in her application a table with collapsible legs, but she originally claims a table and does not limit her broadest claims to collapsible legs; (2) the PTO

glean whether it should serve to restrict the use of the doctrine of equivalents.

The question of what actually constitutes a conflict between the position taken by the patentee in court in order to expand the claims under the doctrine of equivalents and the position that the patentee/applicant took before the PTO is frequently unclear. The Federal Circuit has swung widely in its decisions between strict and liberal approaches. To the extent that an expansive approach to prosecution history estoppel is designed to slow or arrest the expansion of the doctrine of equivalents, that approach is ad hoc and doomed to fail as a means of control because the two doctrines are bottomed on widely different principles.³¹ Whatever approach is taken to prosecution history estop-

rejects the broad claims as unpatentable over certain prior art references; (3) the applicant then amends the broad claim by adding limitations relating to collapsible legs; and (4) the claims are then allowed. In such a situation, the doctrine of prosecution history estoppel precludes the patentee from thereafter claiming infringement by another table that does not have collapsible legs.

Prosecution history estoppel may also arise based on arguments that the applicant made to the PTO to secure the allowance of claims, even if the applicant did not actually amend the claims, as long as the applicant relied on limitations in the claims to distinguish the invention from cited prior art. *See, e.g.,* Litton Sys., Inc. v. Whirlpool Corp., 728 F.2d 1423, 1439 (Fed. Cir. 1984) (stating that there was "no reason not to extend traditional estoppel doctrine" in such a situation); Coleco Indus., Inc. v. United States Int'l Trade Comm'n, 573 F.2d 1247, 1257 (C.C.P.A. 1978) (noting that estoppel may arise "from arguments not directed specifically to examiner's cited references but directed to a reference cited by applicant").

When the applicant amends the claims through a limitation, or argues a limitation without actual amendment in order to distinguish the claim from prior art, courts will not "undertake the speculative inquiry" concerning whether the examiner would have allowed the claim if the limitation had not been added or argued. *See* Kinzenbaw v. Deere & Co., 741 F.2d 383, 389 (Fed. Cir. 1984), *cert. denied*, 470 U.S. 1004 (1985). The Federal Circuit also has cautioned, however, that, in determining whether prosecution history estoppel applies, it is important to ascertain *what* the applicant gave up and *why*. Thus, an amendment of a claim does not automatically "bar all resort to the doctrine of equivalents." *Hughes Aircraft*, 717 F.2d at 1362. The Federal Circuit's willingness in *Hughes* to look at *what* was given up is different from the strict *Kinzenbaw* approach, which would find an estoppel once it was determined that the applicant limited a claim in a particular way. The Federal Circuit's more flexible approach does not suggest that, once the nature of the limitation is determined, courts are free to second-guess the PTO Examiner and determine whether the limitation should have been required in the first instance. Such a "second-guess" approach would frustrate the entire purpose of the estoppel doctrine, which is intended to stop an applicant from effectively appealing the PTO determination that the applicant chose not to appeal when the decision was made originally. Nevertheless, the more liberal approach of *Hughes* to prosecution history estoppel ultimately allows a patent holder to use a broader range of equivalents than would be allowed under the approach used in *Kinzenbaw*.

³¹ The various approaches taken by the Federal Circuit to the application of prosecution history estoppel and the reasons why it is not an appropriate doctrine to use to control the excesses of the doctrine of equivalents are discussed in Adelman, *Federal Circuit*, *supra* note 9, at 997-1000.

pel, the doctrine of equivalents serves to introduce great uncertainty into claims interpretation.³² Indeed, even defenders of the doctrine recognize that any case involving the doctrine of equivalents requires a choice "between conflicting policies."³³

The doctrine of equivalents is the primary (although not the exclusive) cause of the current uncertainty surrounding the scope of patent claims. This uncertainty has serious consequences. First, uncertainty about the scope of patent protection hinders both patent holders and potential defendants from assessing the possible outcome of litigation³⁴ or from making other business decisions, such as the direction that research and development efforts should take.³⁵ Second, a primary purpose of the protection of intellectual property is to encourage the production of inventions, literary works, and the like.³⁶ Patent law in

³² In *Texas Instruments, Inc. v. United States International Trade Commission*, 805 F.2d 1558 (Fed. Cir. 1986), Judge Newman noted that:

The doctrine of equivalents . . . exists solely for the equitable purpose of "prevent[ing] an infringer from stealing the benefit of an invention." To achieve this purpose, equivalency is judicially determined by reviewing the content of the patent, the prior art, and the accused device, and essentially redefining the scope of the claims. This constitutes a deviation from the need of the public to know the precise legal limits of patent protection without recourse to judicial ruling. For the occasional pioneering invention, devoid of significant prior art . . . whose boundaries probe the policy behind the law, there are no immutable rules. We caution that the incentive to innovation that flows from "inventing around" an adversely held patent must be preserved. To the extent that the doctrine of equivalents represents an exception to the requirement that the claims define the metes and bounds of the patent protection, we hearken to the wisdom of the Court in *Graver Tank*, that the purpose of the rule is "to temper unsparing logic" and thus to serve the greater interest of justice.

Id. at 1572 (citations omitted).

³³ *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 945 (Fed. Cir. 1987) (Bennett, J., dissenting in part), *cert. denied*, 108 S. Ct. 1226 (1988). As Judge Bennett noted:

On the one hand, there is the historic right of affording the public fair notice of what the patentee regards as his claimed invention in order to allow competitors to avoid actions which infringe the patent and to permit "designing around" the patent. On the other hand, equally important to the statutory purpose of encouraging progress in the useful arts, is the policy of affording the patent owner complete and fair protection of what was invented.

Id. (Bennett, J., dissenting in part) (citation omitted).

³⁴ This problem is exacerbated when juries, whose members usually lack both technological and legal training, are applying the doctrine of equivalents. A critical review of the use of juries in patent cases is contained in Adelman, *Federal Circuit*, *supra* note 9, at 1004-07.

³⁵ See Jessup, *The Doctrine of Equivalents*, 54 J. PAT. OFF. SOC'Y 248, 251 (1972) (noting the effect of uncertainty on the patent lawyer advising a client engaged in new product development).

³⁶ There has always been a dispute concerning whether the purpose of intellectual

particular provides a claiming system to put other potential inventors on notice of the precise boundaries of the invention so that they may "design around" the patent³⁷ other inventive efforts. The uncertainty generated by the doctrine of equivalents frustrates and chills the activities of these other inventors, who must be concerned about whether their efforts will be met by an infringement suit based on the amorphous doctrine of equivalents. Third, the doctrine permits abusive infringement actions claiming that the defendant infringes under the doctrine of equivalents and that a jury must decide the correctness of the claim. The imperative to settle under these circumstances is almost overpowering.³⁸ Fourth, due process concerns are potentially raised to the extent that pervasive and systemic uncertainty generated by the doctrine of equivalents destroys the ability of patent claims to provide fair notice, so that they effectively provide no notice.³⁹

property is to provide an "incentive" to inventors and authors, or whether intellectual property represents some sort of "natural right." For a discussion of the various theories of protection, see 1 LIPSCOMB'S WALKER ON PATENTS § 1:6 (3d ed. 1984) (outlining the early history of patent law in England and the United States in order to survey the theories underlying the law over time); see also Adelman, *The Supreme Court, Market Structure, and Innovation: Chakrabarty, Rohm and Haas*, 27 ANTI-TRUST BULL. 457, 461-66 (1982) [hereinafter Adelman, *Supreme Court*] (surveying various asserted costs of the patent system and concluding that, properly understood, they are not high in relation to the benefits and incentives created). For a spirited debate on the "incentive" theory of intellectual property protection as it applies to copyright, see Breyer, *Copyright: A Rejoinder*, 20 UCLA L. REV. 75, 76 (1972) (pointing out that forces other than copyright protection may be at work to sustain production); Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 313-21 (1970) (questioning the efficacy of the "incentive" theory by suggesting various benefits to be derived from abolishing certain copyrights); Tyerman, *The Economic Rationale for Copyright Protection for Published Books: A Reply to Professor Breyer*, 18 UCLA L. REV. 1100, 1102-03 (1971) (arguing that the existing federal copyright structure is an efficient and proven system stimulating the production of a wide variety of books); see also Francione, *supra* note 7, at 537-38 (arguing that copyright is granted as an incentive to authors rather than as a recognition of the fruits of their intellectual labors). For a discussion of the "natural right" view, see Denicola, *Copyright in Collections of Facts: A Theory for the Protection of Nonfiction Literary Works*, 81 COLUM. L. REV. 516, 519 (1981) ("Notions of a natural right to the fruits of one's labor are as much a part of copyright as the careful balancing of incentive and dissemination.").

³⁷ See *State Indus., Inc. v. A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985) (noting that the incentive to "design around" other patented products should not be discouraged). Designing around an existing patent is not wasteful economic activity, as some economists have argued. See Adelman, *Supreme Court, supra* note 36, at 464 (contending that resources are wasted only when the invention would have been made in the absence of the patent system and the parties have failed to agree on a license, which is a very uncommon occurrence).

³⁸ Cf. Alster, *New Profits from Patents*, FORTUNE, Apr. 25, 1988, at 185, 185 (noting the deliberate use of lawsuits by Texas Instruments as a means "to pressure competitors into paying hundreds of millions [of dollars] in license fees it might not otherwise have collected").

³⁹ Judge Nies' "additional views" in *Pennwalt* recognized that due process con-

II. PENNWALT: THE FEDERAL CIRCUIT ADOPTS THE ELEMENT-BY-ELEMENT APPROACH

A. *The Pennwalt Decision*

*Pennwalt Corp. v. Durand-Wayland, Inc.*⁴⁰ involved a patent on an apparatus that rapidly sorted items, such as fruit, by color, weight, or a combination of color and weight. The four claims-at-issue (1, 2, 10, and 18) in the Pennwalt patent were expressed in "means-plus-function" language.⁴¹

Claims 1 and 2 described a sorter that transports items along a track with an electronic device that generates a signal proportional to the weight of the item.⁴² The device included the following means: reference signal means; signal comparison means (to compare the weight

siderations were involved:

Violation of rights arising from a patent grant carries serious penalties. Each grant is in effect an extension of the statute itself. As a matter of due process under the fifth amendment, reasonable notice must be given to the public of what conduct must be avoided. Whether in civil or criminal proceedings, it is unequivocally established that that basic right to notice applies. Thus, Congress placed in the statute the requirement that the patent application "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." That requirement reflects the need for notice of what constitutes violation of a patentee's rights. The public cannot be held to "obedience to a rule or standard which was so vague and indefinite as really to be no rule or standard at all." Further, the courts cannot, by interpretation, place a gloss on the statutory requirement which has that effect. An infringement standard as vague as application of the "invention as a whole," which permits claim limitations to be read out of the claim, would nullify the statutory requirement and violate due process. It would also run counter to the specific limitations and protections of 35 U.S.C. §§ 251 and 252 (1982) with respect to broadening claims after issuance.

The doctrine of equivalents was *created* as a matter of equity, but its *application* does not depend simply on "equities." Infringement on the basis of judicial fiat or jury sympathies resolving the vague question of whether a "fraud" has been committed on the "invention as a whole" *cannot* be the law.

Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 954 (Fed. Cir. 1987) (Nies, J., additional views) (citations omitted), *cert. denied*, 108 S. Ct. 1226 (1988).

In our view, the due process considerations that Judge Nies discussed regarding the doctrine of equivalents as applied to the invention as a whole are equally applicable to the doctrine applied on an element-by-element basis.

⁴⁰ 833 F.2d 931 (Fed. Cir. 1987) (in banc), *cert. denied*, 108 S. Ct. 1226 (1988).

⁴¹ See *Pennwalt Corp. v. Durand-Wayland, Inc.*, 225 U.S.P.Q. (BNA) 558, 564-65 (N.D. Ga. 1984). A patent applicant is permitted to express an element in a claim for a combination as "a means or step for performing a specified function." 35 U.S.C. § 112, para. 6 (1982). For example, the legs of a chair could be described in "means-plus-function" language as a means for keeping the seat of a chair a particular distance from the floor. See *infra* notes 204-13 and accompanying text.

⁴² See *Pennwalt*, 225 U.S.P.Q. (BNA) at 564.

signals to the reference signals); clock means (to signal a change in the position of an item); position indicating means (to respond to the comparison signal means and the clock signal means for "continuously indicating the position of an item to be sorted"); and discharge means (to respond to the position-indicating signal in order to discharge an item to be sorted at a predetermined position).⁴³ Claims 10 and 18 described a multifunctional apparatus in which the item is transported along the weighing device and is also scanned optically in order to produce a signal proportional to the color of the item; the weighing device and color sensor are then combined and a signal is sent to discharge the item into the appropriate receptacle.⁴⁴

Pennwalt alleged that two sorters manufactured by Durand-Wayland infringed the Pennwalt patent. The specification of the Pennwalt sorter describes a "'hard wired' network consisting of discrete electrical components which perform each step of the claims."⁴⁵ The two Durand-Wayland sorters used computer software programs: The first sorter, the "Microsizer," had a central processing unit that used one of two possible software programs to sort by weight alone; the second sorter used a third software program to sort by weight and color by employing both the "Microsizer" and a color detection machine called a "Microsorter."⁴⁶

The district court, sitting without a jury, found the Pennwalt patent valid, but did not find that the accused devices infringed the patent. The court observed that the "machine described in the patent-in-suit and the 'Microsizer' are virtually identical *except* for the control system that conducts the sorting operations."⁴⁷ There was no literal infringement, because the accused device did not "use the 'hard-wired' components or elements which perform the identical functions as those described in the patent-in-suit, and these machines do not make the color decision until after the fruit has arrived at the electronic weight scale."⁴⁸ Specifically, according to the court, the accused devices did not perform three functions: comparing signals,⁴⁹ tracking position,⁵⁰ or

⁴³ See *id.* Claims 1 and 2 of the Pennwalt Sorter, U.S. Patent No. 4,106,628, are reprinted in the opinion of the district court. See *id.*

⁴⁴ See *id.* at 564-65. Claims 10 and 18 of the Pennwalt Sorter, U.S. Patent No. 4,106,628, are reprinted in the opinion of the district court. See *id.*

⁴⁵ *Pennwalt*, 833 F.2d at 933.

⁴⁶ See *id.*; *Pennwalt*, 225 U.S.P.Q. (BNA) at 560.

⁴⁷ *Pennwalt*, 225 U.S.P.Q. (BNA) at 569.

⁴⁸ *Id.*

⁴⁹ According to the district court, the accused devices converted analog signals to a digital number and did not "literally compare signals as described in the [patent] . . . but rather . . . use[d] mathematical calculations [a series of subtractions] to determine the desired weight and color data." *Id.* The claimed invention compared analog signals

generating a signal proportional to the color of the item to be sorted.⁵¹

The district court next examined whether the accused devices infringed the functional claims of the Pennwalt patent. This inquiry was two-pronged in order to determine (1) whether the microprocessor in the accused device could be a "means" within the functional claims or whether only hard-wire components could constitute means within those claims, and (2) if the means could include a microprocessor, whether that microprocessor was the "legal equivalent" of the hard-wired components.⁵²

With respect to the first prong of the inquiry, the court held that Pennwalt was not limited to the embodiment disclosed in the specification because it was not necessary that the inventor disclose every mode for practicing the invention. Although the court found that the microprocessor could be an equivalent means, it was not an equivalent means because it did not perform the functions that the claimed invention performed. Finally, the court focused on whether the "different elements and operations" in the accused device, particularly the fact that the accused device performed different functions through different means, constituted the "legal equivalent" of those in the Pennwalt device.⁵³ The court concluded that although one skilled in the art may have known that technology had changed from electronic and logic circuitry to microprocessors, this person would not be "aware of the new elements, functions and operations that had to be developed in order to successfully implement a microprocessor based sorting machine."⁵⁴

The Federal Circuit affirmed the finding of no infringement, but vacated as moot the judgment of validity.⁵⁵ First, the majority confronted Pennwalt's arguments that the accused devices literally in-

with analog reference voltages in order to determine weight and color data. *See id.*

⁵⁰ The district court found that the claimed invention used shift registers that responded to clock pulses to indicate the positions of items, while the accused device stored weight and color data in queues and pointers that pointed to the location of data that corresponded to the items to be sorted. *See id.*

⁵¹ The district court found that the accused devices did not generate a signal proportional to the color of the item, but rather operated on the light that is reflected off an item. *See id.* at 569-70.

⁵² *See id.* at 570-71. Durand-Wayland argued that Pennwalt elected to limit the functional claims to hard-wired components based on the disclosure in the specification. *See id.*

⁵³ *See id.* at 572.

⁵⁴ *Id.* In dissent, Judge Bennett criticized the district court for focusing on whether those with ordinary skill in the art would know how to substitute microprocessors for hard-wired circuitry. *See Pennwalt*, 833 F.2d at 942 & n.5 (Bennett, J., dissenting in part).

⁵⁵ *See id.* at 932. Judge Bissell wrote the majority opinion for the Federal Circuit, joined by Chief Judge Markey and Judges Friedman, Rich, Davis, Nies, and Archer. *See id.*

fringed the patent and that the district court had improperly interpreted the functional claim language in light of the structure disclosed in the specification. The court held that, in order to show literal infringement of a functional claim, a "court must compare the accused structure with *the disclosed structure*, and must find equivalent *structure* as well as *identity* of *claimed* function for that structure."⁵⁶ The majority deemed it unnecessary to determine whether the district court had properly decided if there was equivalency of structure because the district court had found that not all of the claimed functions were performed by the accused devices. Because there was no identity of function, the issue of equivalency of means became irrelevant.

The Federal Circuit turned next to the doctrine of equivalents. The majority appeared to base its decision on two separate grounds, which were blended in the opinion. First, the court held that analysis of infringement under the doctrine of equivalents required an element-by-element comparison in order to determine whether there was an equivalent for each element. This approach did not mean that the entire function/way/result test needed to be applied to each element; instead, the equivalent infringement could be found "if an accused device performs substantially the same overall function or work, in substantially the same way, to obtain substantially the same overall result as the claimed invention."⁵⁷

In *Pennwalt*, as in most equivalents cases, there was no dispute that the accused device performed substantially the same overall function or work and achieved substantially the same overall result.⁵⁸ In most cases, the issue is almost invariably whether the accused device performs the overall function in substantially the same way as the

⁵⁶ *Id.* at 934; see also *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1562 (Fed. Cir. 1986) (stating that literal infringement requires that the accused device embody every element of the claim, which can be accomplished through identical means or equivalent functions); *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 974 (Fed. Cir. 1985) (noting that "means plus function" claims "cover both the disclosed structure and equivalents thereof"); *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1575 (Fed. Cir. 1985) (pointing out that the question in such situations is "whether the single means in the accused device which performs the function stated in the claim is the same as or an equivalent of the corresponding structure described in the patentee's specification").

⁵⁷ *Pennwalt*, 833 F.2d at 934.

⁵⁸ Judge Bennett observed:

[T]here is no dispute that the two devices at issue perform the same overall function and achieve the same overall result. Thus, the relevant inquiry, as it is in nearly all doctrine of equivalents analyses, is whether the accused device and the claimed invention perform the same overall function to achieve the same overall result in substantially the same way.

Id. at 940 n.3 (Bennett, J., dissenting in part).

claimed invention.⁵⁹ Under the element-by-element approach, each element of the claim is examined to determine whether it or its equivalent exists in the accused device. If there is no correspondence, the accused device will not be deemed to operate in substantially the same way as the claimed invention. There can be no infringement under the doctrine of equivalents under two conditions: if an element is missing completely from the accused device and there is no equivalent of the missing element or if an element has been changed in the accused device and the changed element does not operate in substantially the same way. If, as was the case in *Pennwalt*, a claim has functional elements and the accused device does not perform a particular function, then one must be able to point to something in the accused device that serves as an equivalent of that functional limitation.⁶⁰

The Federal Circuit held that the trial court had applied the proper standard concerning the doctrine of equivalents⁶¹ and that its finding of no infringement was not clearly erroneous.⁶² The court rejected Pennwalt's argument that the accused devices merely substituted computer technology for the hard-wired circuitry.⁶³ Rather, the district court had found that the microprocessor in the accused devices was not programmed to perform certain functions. The Federal Circuit focused specifically on the district court's finding that the accused devices did not have any position-indicating means.⁶⁴

The majority agreed that the accused devices lacked the equivalent of the tracking function because the microprocessor in those devices could be, but was not, programmed to track position. In addition, the claimed device required that the position-indicating means be responsive to the signal from the comparison means, but the accused devices made no comparison of signals before the point at which the item to be sorted was discharged. The court found that the district court "correctly rejected" Pennwalt's argument that the memory components of the ac-

⁵⁹ The "way" prong of the test is the focus of most equivalents inquiries for the following reason: "That a claimed invention and an accused device may perform substantially the same function and may achieve the same result will not make the latter an infringement under the doctrine of equivalents where it performs the function and achieves the result in a substantially different way." *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1531 n.6 (Fed. Cir. 1987).

⁶⁰ See *Pennwalt*, 833 F.2d at 939 ("No means with an equivalent function was substituted in the accused devices and thus there can be no infringement under the doctrine of equivalents.").

⁶¹ See *id.* at 935.

⁶² See *id.* at 939.

⁶³ See *id.* at 938.

⁶⁴ The majority appeared to rely on that portion of the district court opinion dealing with literal infringement. This point was noted in Judge Bennett's dissent. See *id.* at 943 (Bennett, J., dissenting in part).

cused devices, which involved the storage of data in queues and the use of pointers that moved synchronously with the movement of the conveyor cups, performed a function equivalent to that of the position-indicating means.⁶⁵ The majority concluded that, because the accused devices did not involve later-developed technology that "should be deemed within the scope of the claims to avoid pirating of an invention," the doctrine of equivalents was not appropriate.⁶⁶

Second, the Federal Circuit went beyond the district court's analysis and held that Pennwalt had added the function of tracking position in order to get around prior art, which taught memory storage, but did not track location of the items to be sorted; thus, the Federal Circuit held that Pennwalt could not now avoid those limitations.⁶⁷

In dissent, Judge Bennett argued four points. First, the doctrine of equivalents must be "undertaken in light of the entirety of the accused device and entirety of the patent-in-suit," not on an element-by-element basis.⁶⁸ Second, the majority's approach merged the literal infringement and equivalent infringement inquiries: "[T]he same features which defeat the possibility of literal infringement are now being used to preclude possible application of the doctrine of equivalents."⁶⁹ Third, under the dissent's view of the doctrine of equivalents, the accused devices infringed. Judge Bennett found that neither the claimed invention nor the accused devices stored or directly indicated the position of the sorted item;⁷⁰ rather, both devices stored data corresponding to color and weight until the item to be sorted reached the proper drop location. The claimed invention stored data in shift registers; the accused devices used queues and pointers that moved synchronously with the movement

⁶⁵ *See id.* at 938. The majority's reading of the trial court's opinion is difficult to reconcile with the text of the lower court's decision. The lower court appeared confused about the analysis of functional claims, and it is difficult to see how the trial court did anything more than use its literal infringement findings as the basis for its equivalence analysis.

⁶⁶ *Id.*

⁶⁷ *See id.* at 937-38. The majority reaffirmed the more liberal view of prosecution history estoppel, under which the narrowing of a claim in order to obtain a patent does not completely prohibit the recapture of some of what was originally claimed. *See id.* at 939.

⁶⁸ *Id.* at 940 (Bennett, J., dissenting in part).

⁶⁹ *Id.* at 947 (Bennett, J., dissenting in part).

⁷⁰ *See id.* at 944 (Bennett, J., dissenting in part). Judge Bennett argued that the position-indicating means were not really intended to, nor did they, convey directly the position of an item; rather, they merely constituted a set of shift registers in which a register corresponded to each conveyor location. Although the location of a given item could be determined by counting the data for that item in the shift register, shift registers were intended to store and move data, not to convey information about position. *See id.* (Bennett, J., dissenting in part).

of the conveyor cups.⁷¹ According to the dissent, the lower court and the majority never reached the question “whether the queues and pointers perform in substantially the same way the functions of the claimed position indicating means when the latter are interpreted in light of the specification.”⁷² Similarly, the accused devices compared the data obtained from the color scanner to reference values when the item reached the weight scale, rather than at the time of the scanning.⁷³ Nevertheless, there was an equivalent “when the accused device is viewed in its entirety and compared to the claimed invention as a whole.”⁷⁴ Fourth, Judge Bennett rejected the majority’s views on prosecution history estoppel. He stated that the accused devices and the claimed invention both performed continuously “in equivalent manners” the position-indicating function.⁷⁵

Judge Nies, who joined the majority, wrote separately to explain how the element-by-element approach to the doctrine of equivalents used by the majority is completely consistent with past precedent and with the policies underlying the doctrine.⁷⁶ Judge Newman, who joined the dissent, wrote separately to explain how the majority’s views were completely inconsistent with both precedent and policy.⁷⁷

B. *Confusion in the Pennwalt Analyses*

The Federal Circuit viewed its decision in *Pennwalt* as representing an important statement about the doctrine of equivalents and as reducing the uncertainty generated by the doctrine. The decision is flawed, however, in several material respects. This Section examines briefly two difficulties raised by the various *Pennwalt* analyses.

1. Reliance on Prosecution History Estoppel

The majority held that *Pennwalt* had added the position-indicating means in order to distinguish over prior art that taught storing information with respect to sorting criteria in memories, rather than shift registers. Thus, prosecution history estoppel precluded *Pennwalt* from attempting to avoid the limitation by relying on the doctrine of equivalents.⁷⁸

⁷¹ See *id.* (Bennett, J., dissenting in part).

⁷² *Id.* (Bennett, J., dissenting in part).

⁷³ See *id.* at 944-45 (Bennett, J., dissenting in part).

⁷⁴ *Id.* at 944 (Bennett, J., dissenting in part).

⁷⁵ *Id.* (Bennett, J., dissenting in part).

⁷⁶ See *id.* at 949-54 (Nies, J., additional views).

⁷⁷ See *id.* at 954-75 (Newman, J., commentary).

⁷⁸ See *id.* at 938. The whole point of prosecution history estoppel is to preclude

This portion of the court's opinion is particularly confusing. Under the element-by-element approach adopted by the majority, the doctrine of prosecution history estoppel is irrelevant, because if there is no equivalent of a particular claim limitation, it does not matter why the limitation was added. Once it is determined that the accused device does not have at least the equivalent of any element, the equivalence inquiry comes to an abrupt halt. Consider a claim with three elements: *A*, *B*, and *C*. If the accused device lacks *C* altogether, either literally or equivalently, then under an element-by-element approach it is irrelevant that *C* was added to distinguish over prior art when the PTO rejected a claim comprised of *A* and *B*.⁷⁹

The doctrine of prosecution history estoppel is relevant, however, to the "entirety" theory of equivalents, which requires that the equivalence analysis be undertaken in light of the entirety of the accused device and the entirety of the patent in suit. For example, consider the following chain of events: (1) the original claim consists of limitations *A*, *B*, and *C*; (2) the claim is rejected by the PTO in light of prior art; (3) the applicant adds a new limitation, *D*; and (4) the PTO then allows the claim. In this situation, the doctrine of prosecution history estoppel holds that the patentee cannot rely on the doctrine of equivalents to argue that a device that has elements *A*, *B*, and *C* infringes because it is equivalent to *A*, *B*, *C* and *D*. In *Pennwalt*, the majority held that when Pennwalt added the position-indicating means in order to distinguish over prior art that showed memory storage of sorting criteria, it was thereby estopped from arguing that the accused device, which had a computer memory for the storage of sorting criteria, was equivalent to the position-indicating means.

For all intents and purposes, the majority analyzed the equivalents question under both the element-by-element approach and the entirety approach. The majority found as not clearly erroneous what it viewed as the district court's holding that the accused device did not have a position-indicating means either literally⁸⁰ or under the doctrine of equivalents.⁸¹ The majority also went beyond this element-by-element approach, however, and held that Pennwalt was estopped by its prose-

the patentee from using the doctrine of equivalents to recapture in court something that she gave up during the patent prosecution. See *supra* notes 30-31 and accompanying text.

⁷⁹ If, however, there is an equivalent of a particular limitation in the accused device, then it would be relevant to determine whether prosecution history estoppel precluded reliance on the doctrine of equivalents in that instance.

⁸⁰ See *Pennwalt*, 833 F.2d at 934.

⁸¹ See *id.* at 935.

cution history from relying on the doctrine of equivalents.⁸² This additional holding by the court would have been totally irrelevant under the element-by-element approach; likewise, the holding would have made sense only if the court took the view that Pennwalt was estopped from arguing that the accused device as a whole functioned in substantially the same way as the claimed invention through the doctrine of equivalents.

Just as the majority went beyond the element-by-element approach, so did the dissent go beyond the entirety approach. Indeed, although Judge Bennett purported to apply an entirety approach, his dissent may be characterized as a disagreement about whether one could find a specific equivalent for the position-indicating means in the accused device.⁸³

According to Judge Bennett, neither the accused device nor the claimed invention stored or directly indicated position. The claimed invention used shift registers for storing and shifting information, so that the data moved from register to register as the item to be sorted moved from one conveyor location to the next. In a sense, the registers indicated position because data for a particular item literally tracked the item's position as it moved in the conveyor device. The claimed invention did no more, however, to store or indicate directly item position. According to Judge Bennett, the accused device instead used data queues and pointers that moved synchronously with the movement of the conveyor cups in order to perform the function actually performed by the claimed invention in substantially the same way.⁸⁴ In addition, he found that the accused device employed a comparison of data to reference values, but at a different point in the sorting process.⁸⁵ Thus, although Judge Bennett purported to apply an "entirety" approach, he instead pointed to actual elements of the accused device and found equivalents of the claimed invention.⁸⁶

⁸² See *id.* at 938.

⁸³ See *id.* at 944 (Bennett, J., dissenting in part).

⁸⁴ See *id.* (Bennett, J., dissenting in part).

⁸⁵ See *id.* at 944-45 (Bennett, J., dissenting in part).

⁸⁶ Judge Bennett also rejected the majority's reliance on the doctrine of prosecution history estoppel. See *id.* at 943-44 (Bennett, J., dissenting in part). According to Judge Bennett, the doctrine was not relevant because both the accused device and the claimed invention "indicate[d] position' in equivalent manners." *Id.* at 943 (Bennett, J., dissenting in part). Judge Bennett's observation about prosecution history estoppel is confusing, because if the position-indicating means was, indeed, added to distinguish over prior art, and if Pennwalt was trying to recapture what it had given up in the PTO, then the doctrine of prosecution history estoppel would prevent the use of the doctrine of equivalents. Moreover it would make no sense to argue that the doctrine was irrelevant because there was an equivalent of the position-indicating means in the accused device. Further, the doctrine of prosecution history estoppel would be relevant

Technically, Judge Bennett's approach may have been correct. Pennwalt's sorter operated by having a set of shift registers associated with each drop position. When the correct drop position was determined for each item to be sorted, a "one" was placed in the first shift register of the set of shift registers associated with that drop position. The drop would then automatically take place a fixed number of clock pulses from that point. The fixed number would correspond to the number of shift registers in the set associated with the drop position.⁸⁷ The Durand-Wayland devices operated differently. Instead of fixing the set of shift registers after a color measurement was made, a reference number was stored in a particular position in memory that was associated with a particular item. The various positions in the memory were then inspected to determine whether, during a particular clock pulse, the item associated with the memory cell should be dropped into its bin currently under the item to be sorted.⁸⁸ The two devices, therefore, used different means to perform equivalent functions.

Pennwalt illustrates the "illusion" of assuming that the choice of equivalents test resolves the uncertainties inherent in the doctrine of equivalents. The choice is largely irrelevant. The majority appeared to find no equivalent for the position-indicating means because the microprocessor in the accused device was not programmed to perform that function, but that lack of function was the foundation of the majority's view that there was no literal infringement. Judge Bennett was correct to observe that the majority's approach effectively merged the doctrines of literal and equivalent infringement. If the majority did not intend to merge the doctrines, and if the absence of a function does not automatically result in a finding of no infringement under the doctrine of equivalents, then it is difficult to determine how the accused device did not perform the function of the claimed invention in substantially the same way. The accused device did not have a position-indicating means that stored or directly indicated position, but its method could be viewed as an equivalent: Instead of a set of fixed sets of shift registers, it had fixed positions in memory and inspected those positions during each clock pulse. The Pennwalt device, on the other hand, automatically inspected the shift register sets; when the "one" signal went through a designated number of clock pulses, it functioned to drop the selected item at the appropriate time into the correct bin.

if there were an equivalent under either the element-by-element test or the entirety test.

⁸⁷ See *id.* at 935-36.

⁸⁸ See *id.*

2. The Merging of Literal and Equivalent Infringement

Judge Bennett argued that "the same features which defeat the possibility of literal infringement are now being used to preclude possible application of the doctrine of equivalents."⁸⁹ This observation was correct in two respects. First, despite the Federal Circuit majority's comments to the contrary, the district court did not appear to have engaged in any analysis of infringement under the doctrine of equivalents. Although the lower court's opinion is by no means clear, the court determined that there was no literal infringement of the claimed invention because the accused device did not perform certain functions.⁹⁰ The district court discussed equivalents, but relied exclusively on the same findings that formed the basis of its conclusion about literal infringement.⁹¹ There was no separate analysis under the doctrine of equivalents.⁹² Second, the Federal Circuit basically adopted the district court's finding that the accused devices lacked a tracking function in order to affirm the lower court's findings of no literal infringement⁹³ or infringement under the doctrine of equivalents.⁹⁴

Judge Bennett's observation warrants further examination, because the element-by-element approach presents logical difficulties concerning the functional claims, although not necessarily in the factual context presented in *Pennwalt*. This difficulty relates to the interaction of the doctrine of equivalents with the notion of equivalents required to be applied in a section 112, paragraph 6⁹⁵ equivalents analysis. The Federal Circuit has interpreted that section to mean that, if a function performed by the accused device is identical to the function performed by the claimed invention, and if the means used by the accused device are at least equivalent to the means used by the claimed invention, then there is literal infringement of the functional claim.⁹⁶ If there is no

⁸⁹ *Id.* at 947 (Bennett, J., dissenting in part).

⁹⁰ *See Pennwalt Corp. v. Durand-Wayland, Inc.*, 225 U.S.P.Q. (BNA) 558, 569 (N.D. Ga. 1984).

⁹¹ *See id.* at 572.

⁹² The district court also discussed equivalents in the context of 35 U.S.C. § 112, para. 6 (1982). *See Pennwalt*, 225 U.S.P.Q. (BNA) at 565. This discussion is particularly confusing, because the district court initially found that the accused devices failed to perform certain functions, but then discussed whether there were equivalent means in order to determine whether those functional claims were infringed. Once it is determined that the accused device does not have a particular function at all, the literal infringement inquiry should come to a halt.

⁹³ *See Pennwalt*, 833 F.2d at 934.

⁹⁴ *See id.* at 934-39.

⁹⁵ 35 U.S.C. § 112, para. 6 (1982).

⁹⁶ *See Data Line Corp. v. Micro Technologies, Inc.*, 813 F.2d 1196, 1201 (Fed. Cir. 1987). We analyze and criticize this approach later in this Article. *See infra* notes 220-23 and accompanying text.

literal infringement because the means used in the claimed and accused devices are not equivalent, then the element-by-element analysis of infringement under the doctrine of equivalents will necessarily conclude that the accused structure does not operate in substantially the same way. Thus, the inquiry for equivalent infringement under an element-by-element approach is precisely the same as the inquiry for literal infringement. The equivalent infringement inquiry only operates under the guise of determining whether the element of the accused device functions in substantially the same way as the claimed invention.

This merging of literal and equivalent infringement through the application of the element-by-element approach is not inevitable in a case like *Pennwalt*; at least as far as the majority was concerned, the accused device lacked certain functions completely. This complete absence opened the door for a more significant equivalent inquiry. The literal infringement inquiry was answered in the negative because there was no identical function. As the majority observed, any analysis of the equivalency of structure was irrelevant, because there was simply no need to determine whether there were any means that operated in substantially the same way. This outcome made it possible to ask whether there was something in the accused device that served as an equivalent function, operating in substantially the same way. The meaningful question of the existence of a substantially similar way was therefore not foreclosed by the literal infringement inquiry.⁹⁷

C. *The Unsolved Problem in Pennwalt*

In *Pennwalt*, the Federal Circuit tried to settle an important issue concerning the doctrine of equivalents. But the court's choice was, in many respects, not important. Whether the doctrine of equivalents is applied on an element-by-element basis or an entirety basis does not answer the key question: What is an "equivalent"?

Language in Federal Circuit decisions suggests that the doctrine of

⁹⁷ The majority apparently did not realize that the element-by-element approach could lead to this merging of literal and equivalent infringement analyses. This failure of recognition stems from the majority's belief that the search for an equivalent function of a functional limitation is somehow different from the determination of equivalence under section 112, paragraph 6. See *Pennwalt*, 833 F.2d at 934. Although there is a distinction between the two types of equivalency analyses when the accused device omits the function entirely, the difference lacks substance if the accused device performs the same function as the claimed functional limitation, but does not have equivalent means. For example, if an accused sorter performs a tracking function, but uses a non-equivalent means to do so, any further analysis under the doctrine of equivalents on an element-by-element basis will inevitably lead to the conclusion that, with respect to that functional limitation, the accused device does not operate in substantially the same way.

equivalents cannot be used to encompass more than an "insubstantial change"⁹⁸ or "minor modification";⁹⁹ ordinarily, however, the cases recite the standard function-way-result test, which gives no indication of what constitutes such a change.¹⁰⁰ Until this question is answered, great uncertainty will surround the doctrine of equivalents, and the court's adoption of the element-by-element approach will do little to ameliorate the situation. This uncertainty will be exacerbated in light of the *Pennwalt* majority's willingness to allow the applicability of the doctrine of equivalents to be a factual issue in every case.¹⁰¹ A patent holder does not have to allege that there has been a "fraud on the patent" before the doctrine of equivalents applies. Rather, this amorphous standard applies in every case.

Pennwalt provides an excellent example of that uncertainty. As a general matter, it would seem that if an element is missing from an accused device both literally and as an equivalent, there would be at least some danger that the "way" prong of the equivalents test would be effectively elided. A determination that the accused device performs substantially the same overall function to achieve substantially the same overall result would lead inexorably to a conclusion that the accused device functions in substantially the same way when the claimed invention and the accused device are considered as wholes.

Moreover, the "criteria" that the courts generally use to determine the application and scope of the doctrine of equivalents do not ameliorate this uncertainty. For example, although a finding of equivalents is a "determination of fact" and "[p]roof can be made in any form,"¹⁰² an important issue concerns 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."¹⁰³ This factor purports to es-

⁹⁸ See *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1532 (Fed. Cir. 1987).

⁹⁹ See *Carman Indus. v. Wahl*, 724 F.2d 932, 942 (Fed. Cir. 1983).

¹⁰⁰ See *infra* notes 113-20 and accompanying text.

¹⁰¹ See *infra* notes 118-19 and accompanying text.

¹⁰² *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 609 (1950).

¹⁰³ *Id.*; see also *Lockheed Aircraft Corp. v. United States*, 553 F.2d 69, 82 (Ct. Cl. 1977) (noting that a useful guide in establishing equivalency is whether a person reasonably skilled in the art would know of the interchangeability of the claimed and accused elements). If someone skilled in the art would have regarded the ingredient as interchangeable, then the patent "enables" that particular change. If a person skilled in the art would recognize that the claimed tap-coupling and the not-claimed loop-coupling were interchangeable, see *infra* notes 105-12 and accompanying text, then that loop-coupling is enabled by the patent even though it is not explicitly claimed.

We strongly suspect that at the time the *Pennwalt* application was filed, those skilled in the art of control systems would have readily appreciated that a computer with a random access memory could have been programmed in a fashion similar to that of Durand-Wayland to perform the control function. Indeed, there was little dispute

establish an inquiry for the finder of fact to aid in determining whether the variation or change in the accused device falls within the permissible scope of equivalents. We argue, however, that this factor should be used to reject rather than support the application of the doctrine of equivalents.¹⁰⁴ One important Federal Circuit case, *Perkin-Elmer Corp. v. Westinghouse Electric Corp.*,¹⁰⁵ seems to reject this test; it recognizes the danger to the peripheral claiming system posed by the doctrine of equivalents. Decided within months of *Pennwalt*, *Perkin-Elmer* is the real landmark decision concerning the doctrine of equivalents.

In *Perkin-Elmer*, the patentee sued Westinghouse for infringement of a patent involving a resonator coupler for an electrodeless discharge lamp used in various types of chemical analyses. The Perkin-Elmer patent claimed a particular type of coupling, called tap-coupling, for connecting a helical coil and the power source, while the accused device used a different type of coupling, called loop-coupling. The tap-coupling in the claimed invention operated by frequency tuning to obtain a high voltage within the lamp and by impedance matching to maximize power transferred from the power source to the lamp.¹⁰⁶ The connecting point between the helical coil and power source in the loop coupling used in the accused device was not fixed for the purposes of frequency tuning or impedance matching.¹⁰⁷ If patent law is going to include a doctrine of equivalents in the conventional sense, then it is difficult to understand how the loop-coupling is not the equivalent of the tap-coupling.¹⁰⁸ A tap-coupling is an auto-transformer device by which one coil serves the function of both a primary and a secondary transformer coil; a loop-coupling is a standard transformer using separate primary and secondary coils.¹⁰⁹

In attempting to invoke the doctrine of equivalents to cover the accused device, Perkin-Elmer relied upon the substitutability factor and argued that those skilled in the art would have regarded the tap-coupling and the loop-coupling as interchangeable. Therefore, the loop-coupling should fall within the range of equivalents. The Federal Cir-

that the Durand-Wayland system was an alternative that was known to those skilled in the art at the time the Pennwalt application was filed. At that time, however, microprocessors were just coming on the market, and the cost of a computer-based system was many times the cost of the Pennwalt circuitry.

¹⁰⁴ See *infra* notes 225-26 and accompanying text.

¹⁰⁵ 822 F.2d 1528 (Fed. Cir. 1987) (Markey, C.J.).

¹⁰⁶ See *id.* at 1531.

¹⁰⁷ See *id.*

¹⁰⁸ See *id.* at 1541 (Newman, J., dissenting).

¹⁰⁹ See *id.* at 1531.

circuit rejected this argument, holding that, although this interchangeability was a factor in considering whether the doctrine of equivalents applied, "the accused devices must still perform substantially the same function in substantially the same way to obtain the same result."¹¹⁰ Furthermore, "evidence that tap-coupling and loop-coupling were known to be interchangeably useful in effecting power transfer in entirely different and unrelated environments cannot serve as a basis for enlarging the subject matter explicitly set forth in the claim."¹¹¹ The Federal Circuit's rejection of the use of the substitutability factor is to some degree begging the question. If substitutability is a factor to be used in determining whether the doctrine of equivalents is applicable, it is circular to argue that the substitutability factor does not serve as a criterion for applying the doctrine of equivalents if the doctrine of equivalents is not applicable.¹¹²

In many respects, the doctrine of equivalents, at least prior to *Perkin-Elmer*, is the patent law analogue to the concept of "substantial similarity" used in copyright law. In copyright law, liability for infringement may be imposed when an alleged infringer uses expression that is either the same as or "substantially similar" to the protected expression.¹¹³ What constitutes "substantial similarity" is generally a question of fact to be resolved by the fact finder on a case-by-case basis. A determination that there is or is not substantial similarity is reviewed by appellate courts under a "clearly erroneous" standard.¹¹⁴ There are

¹¹⁰ *Id.* at 1535.

¹¹¹ *Id.* The Federal Circuit majority focused on other factors that, in its view, militated against application of the doctrine of equivalents. *See id.* at 1532-35.

¹¹² In refusing to apply the substitution factor, the Federal Circuit in *Perkin-Elmer* may have thought that the reverse doctrine of equivalents, *see infra* notes 129-30 and accompanying text, applied and that substitution was no longer relevant. The court's discussion of substitution did not occur, however, in the context of a literal infringement analysis, so the reverse doctrine of equivalents would have no application. Moreover, the *Perkin-Elmer* court asserted that the knowledge of interchangeability along with the knowledge that Westinghouse was using loop-coupling at a time when a broadening reissue, *see infra* notes 181-95 and accompanying text, could have been applied for argued against expanding the claims under the doctrine of equivalents. *See Perkin-Elmer*, 822 F.2d at 1533.

¹¹³ *See, e.g., Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp.*, 562 F.2d 1157, 1162 (9th Cir. 1977) (stating that part of the proof of the "copying" element of copyright infringement is a showing of "substantial similarity between the copyrighted work and defendant's work"); *Reyher v. Children's Television Workshop*, 533 F.2d 87, 90 (2d Cir.) (stating that copyright infringement is usually proved in part by "substantial similarities as to protectable material" in a defendant's work), *cert. denied*, 429 U.S. 980 (1976); *Arnstein v. Porter*, 154 F.2d 464, 468 (2d Cir. 1946) (holding that, in the absence of circumstantial evidence of access to copyrighted material, a plaintiff must show "striking similarities," but that with evidence of access, similarities need only be substantial).

¹¹⁴ *See, e.g., International Luggage Registry v. Avery Prods. Corp.*, 541 F.2d 830,

a few guidelines to help the fact finder assess what is substantially similar to the copyrighted work;¹¹⁶ the standard is amorphous and effectively requires the factfinder to compare the "look and feel" of the protected material with that of the accused material.¹¹⁶

Similarly, the doctrine of equivalents, once thought to be a narrow doctrine designed to prevent "fraud on a patent,"¹¹⁷ has become an issue of fact to be resolved in virtually every patent suit. As in copyright law, there are criteria articulated in appellate decisions that are supposed to inform the application of the doctrine of equivalents, but the determination of the applicability of the doctrine remains a fact question that is applied in an ad hoc manner.¹¹⁸ As the court in *Pennwalt* made clear, the issue of infringement under the doctrine of equivalents is reviewed by appellate courts under a "clearly erroneous" standard.¹¹⁹ Indeed, the factual nature of the equivalents inquiry makes summary judgment very difficult to get in any case in which the doctrine of equivalents is raised.¹²⁰

831 (9th Cir. 1976) (reversing a district court's finding of insufficient similarity because it was clearly erroneous); *Eisenschiml v. Fawcett Publications*, 246 F.2d 598, 603 (7th Cir. 1957) (holding that a finding of insufficient similarity was one of fact subject to a "clearly erroneous" review).

¹¹⁶ For example, a number of appellate courts have held that a finding of "substantial similarity" may not be predicated on the use of portions of a copyrighted work that may not be protectable because these portions are facts or ideas, which are not copyrightable. See *Hoehling v. Universal City Studios*, 618 F.2d 972, 974 (2d Cir.), cert. denied, 449 U.S. 841 (1980). The fact that appellate courts articulate such rules does not mean that trial courts so instruct juries or that there is any other evidence that fact finders actually apply this limiting rule. See *Francione*, *supra* note 7, at 557-67.

¹¹⁶ See, e.g., *Roth Greeting Cards v. United Card Co.*, 429 F.2d 1106, 1110 (9th Cir. 1970) (citing "concept," "feel," and "mood" to find substantial similarity).

¹¹⁷ See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950) ("The essence of the doctrine is that one may not practice a fraud on a patent.").

¹¹⁸ For example, in *Graver Tank*, the Supreme Court held that, in determining whether the doctrine of equivalents applied, "[p]roof can be made in any form," but that

[c]onsideration 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. An important factor 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.

Id. at 609; see also *Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp.*, 562 F.2d 1157, 1164 (9th Cir. 1977) (describing the test for infringement as "inevitably ad hoc") (quoting *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960) (Hand, J.)); *infra* notes 159-60 and accompanying text (discussing a hypothetical fact situation to which the doctrine of equivalents would apply).

¹¹⁹ See *Pennwalt*, 833 F.2d at 936.

¹²⁰ See, e.g., *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1122-23 (Fed. Cir. 1985) (in banc) (reversing a grant of summary judgment because the appli-

In sum, *Pennwalt* was really much ado about nothing. The adoption of the element-by-element approach will do little to mitigate the uncertainty created by the doctrine of equivalents. To the extent that it was intended to brake the expansion of the use of the doctrine of equivalents, it is doomed to fail. Moreover, if one really believed in the conventional theory justifying the broad use of the doctrine of equivalents, we see no basis for distinguishing between expanding a claim as a whole and expanding it by individual elements. In light of the *Pennwalt* analysis, the next Part examines the modern articulation of the doctrine of equivalents by the Supreme Court.

III. THE DOCTRINE OF EQUIVALENTS

A. *The Graver Tank Decision*

Although the use of the doctrine of equivalents originated in 1853,¹²¹ the doctrine found its place in modern patent law in 1950 through *Graver Tank & Manufacturing Co. v. Linde Air Products Co.*¹²² The patent in *Graver Tank* involved a welding process and claimed a welding flux¹²³ containing a major proportion of alkaline earth metal silicate.¹²⁴ The claimed flux consisted of a mixture of silicate of calcium and silicate of magnesium. The accused flux used silicate of calcium, but substituted silicate of manganese, a nonalkaline earth metal, for silicate of magnesium. Significantly, the specification taught that manganese could be substituted for magnesium.

The Court found that, although the accused flux did not infringe the claimed invention literally, it did infringe under the doctrine of

cation of the doctrine of equivalents depends on facts and circumstances unique to each case).

¹²¹ The doctrine of equivalents was first used in *Winans v. Denmead*, 56 U.S. (15 How.) 330, 340-43 (1853). "The exclusive right to the thing patented is not secured, if the public are at liberty to make substantial copies of it, varying its form or proportions." *Id.* at 343.

¹²² 339 U.S. 605 (1950).

¹²³ Welding flux is a blanket of molten metal compounds used to protect freshly deposited molten metal in the welding process, thereby producing sound weld metal. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 167 F.2d 531, 532-33 (7th Cir. 1948), *rev'd in part*, 336 U.S. 271 (1949).

¹²⁴ The Court's 1950 opinion was on rehearing and concerned infringement of the flux claims. The district court found the flux claims in question valid and infringed, but found other flux claims and all welding process claims to be invalid. See *Linde Air Prods. Co. v. Graver Tank & Mfg. Co.*, 86 F. Supp. 191, 199-200 (N.D. Ind. 1947). The court of appeals reversed, finding all of the claims in issue valid. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 167 F.2d 531 (7th Cir. 1948). The Supreme Court reversed the appellate court and reinstated the district court's decision. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 336 U.S. 271 (1949). The Court, however, then granted rehearing on the infringement issues. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605 (1950).

equivalents. The Court held that “[t]he essence of the doctrine [of equivalents] is that one may not practice fraud on a patent.”¹²⁶ The Court explicitly likened this “essential” notion of “fraud on the patent” to the piracy of the “unscrupulous copyist”—the scoundrel of copyright law.¹²⁶ According to the Court, “[o]ne who seeks to pirate an invention, like one who seeks to pirate a copyrighted book or play, may be expected to introduce minor variations to conceal and shelter the piracy,” because “[o]utright and forthright duplication is a dull and very rare type of infringement.”¹²⁷ Moreover, the Court suggested that only “insubstantial” changes would be encompassed by the doctrine.¹²⁸

In contrast, the Court also observed that there is no infringement when the language of a claimed invention reads directly on an accused device that seems to be an ostensibly literal infringement, yet the accused device “is so far changed in principle from a patented article that it performs the same or a similar function in a substantially different way.”¹²⁹ This doctrine is known as the “reverse doctrine of equivalents.”¹³⁰

¹²⁶ *Graver Tank*, 339 U.S. at 608.

¹²⁸ *See id.* at 607.

¹²⁷ *Id.* The Court held that “a patentee may invoke this doctrine to proceed against the producer of a device ‘if it performs substantially the same function in substantially the same way to obtain the same result.’” *Id.* at 608 (quoting *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929)). The Court noted that the doctrine applied both to pioneer, or primary, inventions and to secondary inventions “consisting of a combination of old ingredients which produce new and useful results.” *Id.* (citation omitted).

According to the Court, “[w]hat constitutes equivalency must be determined against the context of the patent, the prior art, and the particular circumstances of the case,” and “[e]quivalence . . . is not the prisoner of a formula and is not an absolute to be considered in a vacuum.” *Id.* at 609. Although “[a] finding of equivalence is a determination of fact” and “[p]roof can be made in any form,” the Court stressed that “[a]n important factor 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.” *Id.*

¹²⁸ *See id.* at 610; *see also infra* notes 161-64 and accompanying text (discussing “insubstantial” changes).

¹²⁹ *Graver Tank*, 339 U.S. at 608.

¹³⁰ *SRI International v. Matsushita Electric Corp. of America*, 775 F.2d 1107 (Fed. Cir. 1985) (in banc), is the leading case in the Federal Circuit dealing with the reverse doctrine of equivalents. The doctrine applies only when the claim or claims literally read on the accused product or process. In such a case, the defendant may assert that the claim or claims are not infringed in spirit. Under the reverse doctrine of equivalents, there will be no infringement if the accused device and the claimed device function in substantially different ways. *See id.* at 1118.

The reverse doctrine of equivalents limits the scope of a patent, especially in light of technical developments that occur after the filing date of a patent application. *See In re Hogan*, 559 F.2d 595, 605 (C.C.P.A. 1977). *Hogan* involved a claim that was enabled as of the filing date, but, because of technical developments that occurred between the filing date and the issue date, was not enabled at the time the patent issued. *See id.* at 605-06. Most likely, the court should have required an amendment to the claim to

The Court affirmed the district court's finding that the accused flux was substantially identical in operation and result. The Court focused specifically on evidence indicating that the prior art disclosed the use of manganese silicate as an ingredient in welding compositions, and that those skilled in the art would have regarded manganese silicate as interchangeable with magnesium silicate. In conclusion, the Court noted that "[i]t is difficult to conceive of a case more appropriate for application of the doctrine of equivalents."¹³¹

In dissent, Justice Black, joined by Justice Douglas, endorsed the majority's view that the doctrine of equivalents was intended to prevent "fraud" and "piracy," but argued that there was no such "malevolence" even alleged against the infringer.¹³² Further, the dissent expressed concern that the Court's liberal application of the doctrine of equivalents in circumstances that did not involve any wrongdoing by the putative infringer created potential dangers. Specifically, patentees could use the doctrine of equivalents to broaden a patent claim, treating that claim "like a nose of wax which may be turned and twisted in any direction."¹³³ The dissent argued that Congress had provided two safeguards: patent claims must be specific, and the reissue process could be used to assist patentees who had failed to claim an adequate scope of protection.¹³⁴ In addition, the dissent noted that the district court had explicitly refused to go beyond the specification of the claimed invention, which had disclosed that manganese was an appropriate substitute for alkaline earth metals.¹³⁵ While it was true that some of the original patent claims covered manganese silicate, these claims were found to be invalid because they were too broad. Finally, the dissent pointed out that the patent holder's failure to claim manganese was probably intentional, because the patent holder had reason to fear that such claims would have been denied in light of the use of manganese in prior ex-

solve the enablement problem; instead, it focused on the filing date as the date at which the scope of the claim should be measured under patent law rules. The court was not concerned with the possibility that such a claim would give the patentee more than she was entitled to claim, because the reverse doctrine of equivalents was available in court to limit the claim. *See id.* at 607.

¹³¹ *Graver Tank*, 339 U.S. at 612.

¹³² *See Graver Tank*, 339 U.S. at 612-13 (Black, J., dissenting).

¹³³ *Id.* at 614 (Black, J., dissenting) (quoting *White v. Dunbar*, 119 U.S. 47, 51 (1886)).

¹³⁴ *See id.* at 614-15 (Black, J., dissenting). The dissent acknowledged that the reissue process had limited application insofar as broadening reissues were concerned. *See id.* at 615 (Black, J., dissenting).

¹³⁵ The dissent argued that, contrary to the majority's view, the district court had not gone beyond the specification in determining that the two substances were interchangeable. *See id.* at 613 (Black, J., dissenting).

pired art.¹³⁶

The standard articulated in *Graver Tank* really had no relationship to the concerns of patent law and was inapplicable to the facts of the *Graver Tank* case. Moreover, given the facts of the *Graver Tank* litigation, the case did not present the typical situation in which the doctrine of equivalents is applied in order to broaden a claim to cover something the PTO had not confronted or validated during the original examination process. As will be explained below, however, the PTO *had* granted a claim that would have covered flux using manganese silicate.

1. Concerns Grounded in Copyright Law

Regardless of the way in which the Court actually applied the standard it articulated, the standard was taken directly and explicitly from another context—copyright law. The doctrine of equivalents in *Graver Tank* was animated by the principle that a patent holder should receive the same protection as a copyright holder from the “piracy” of the “unscrupulous copyist,” who would seek to commit a “fraud on the patent.”¹³⁷

It is not surprising that the doctrine of equivalents should have evolved into the patent law counterpart of the “look and feel” or “substantial similarity” concepts in copyright law: both are doctrines of materiality that seek to define the ambit of intellectual property rights.¹³⁸ But the doctrine of equivalents should not function as a “look and feel” concept of patent law, given the considerable differences between patent rights and copyrights.¹³⁹

Proof of copyright infringement requires that the plaintiff show ownership of the copyright and that the defendant copied the protected item.¹⁴⁰ Defendants do not usually admit to copying, but the plaintiff is permitted to prove copying indirectly by demonstrating that the defendant had access to the copyrighted work and that the defendant’s work is

¹³⁶ See *id.* at 616-17 (Black, J., dissenting). This concern was also articulated by Justice Douglas, who dissented separately. Justice Douglas argued that the use of manganese silicate in the flux was not patentable for various reasons, so that the doctrine of equivalents had effectively given patent protection to an unpatentable article. See *id.* at 618 (Douglas, J., dissenting).

¹³⁷ See *id.* at 607-08.

¹³⁸ See *supra* notes 113-20 and accompanying text.

¹³⁹ See *supra* notes 7-10 and accompanying text.

¹⁴⁰ See, e.g., *Sid & Marty Krofft Television Prods., Inc. v. McDonald’s Corp.*, 562 F.2d 1157, 1162 (9th Cir. 1977) (explaining that “in order to establish copyright infringement a plaintiff must prove ownership of the copyright and ‘copying’ by the defendant”); see also *supra* notes 113-16 and accompanying text (discussing the concept of “substantial similarity”).

substantially similar to the protected work.¹⁴¹ The plaintiff must then convince the fact finder that the defendant wrongfully appropriated something that belongs to the plaintiff.¹⁴² The plaintiff need not show that there has been a verbatim taking in order to show infringement. Most defendants are not so foolish as to copy verbatim, because the copying inquiry would be easily and quickly resolved. The notion of "substantial similarity" between the protected work and the accused work prevents an alleged infringer from escaping liability by making slight changes in the protected work.

Further, in copyright law, two persons working independently who create the exact same novel can both have copyright,¹⁴³ two persons working independently who invent the same device cannot both have patents.¹⁴⁴ Thus, whether one person copies from another is important in copyright law because a second person may effectively eviscerate the entire value of a copyright by independently producing the exact same item and obtaining a copyright on it.

In contrast, the granting of a patent comes after a long and frequently difficult process of negotiation with the PTO. The PTO examines the putative invention and searches the prior art in order to determine whether the application for a patent meets the rigorous standards of patentability.¹⁴⁵ If the patent holder sues for infringement and the defendant wishes to challenge the validity of the patent, she must overcome the statutory presumption of validity¹⁴⁶ and prove invalidity by clear and convincing evidence, a standard that is very difficult to

¹⁴¹ See *Reyher v. Children's Television Workshop*, 533 F.2d 87, 90 (2d Cir.), cert. denied, 429 U.S. 980 (1976).

¹⁴² See *Arnstein v. Porter*, 154 F.2d 464, 468 (2d Cir. 1946). For a discussion of the standard for infringement in copyright cases, see Francione, *supra* note 7, at 523-44.

¹⁴³ Of course, independence will be difficult to prove if the second person to write the novel had access to the first person's novel, because even unconscious copying infringes. See *supra* note 141 and accompanying text; see also *ABKCO Music, Inc. v. Harrisongs Music, Ltd.*, 722 F.2d 988, 998-99 (2d Cir. 1983) (refusing to accept the argument that allowing for subconscious infringement brings the law of copyright improperly close to patent law).

¹⁴⁴ The standards for determining the winner are found in 35 U.S.C. § 102(g) (1982) and interpretive case law. See 3 D. CHISUM, *supra* note 1, § 10.02.

¹⁴⁵ See *supra* notes 5 & 6 and accompanying text. In the case of claims that are ambiguous, the same claim may be given a different scope in court than it would in the PTO. In the PTO, a claim is to be given the broadest possible interpretation, because claims can be amended during the prosecution. See *In re Yamamoto*, 740 F.2d 1569, 1571-72 (Fed. Cir. 1984).

¹⁴⁶ See 35 U.S.C. § 282 (1982 & Supp. IV 1986) ("A patent shall be presumed valid. Each claim of a patent . . . shall be presumed valid independently of the validity of other claims The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity.").

meet.¹⁴⁷ Moreover, if two inventors independently create the same invention, the patent will issue to only one inventor.¹⁴⁸ The grant of a patent thus represents an administrative determination about the scope of patent claims.

A broadly interpreted doctrine of equivalents erodes any administrative determination of patentability by expanding the scope of a claim beyond the administrative process to cover something that the PTO had not reviewed. Thus, the Court's reliance on copyright doctrine ignored the substantial differences between patent and copyright law with regard to copying.

Patent law, unlike copyright law, contains a claiming system to give notice to the public of which ideas are protected by patent and which ideas remain in the public domain. Such notice facilitates "designing around" the patent.¹⁴⁹ A claiming system also incorporates the PTO's opinion with regard to both the validity and scope of any patent. This important aspect is accentuated by having a wide-ranging reexamination system in place.¹⁵⁰ If the patent system were concerned solely with providing suitable disclosure of the invention to the public¹⁵¹ and the appropriate scope of protection for an inventor, it would have no examination system and no claim system. The rights of the inventor would instead be determined in a court at the time that an infringement was asserted.¹⁵² In copyright law, there is no claiming system. The

¹⁴⁷ See, e.g., *Kaufman Co. v. Lantech, Inc.*, 807 F.2d 970, 973-74 (Fed. Cir. 1986) (stating that the challenger of a patent must prove facts supporting the invalidity of the patent under a clear and convincing standard in many different circumstances). However, anyone may seek reexamination of a patent. See 35 U.S.C. §§ 301-307 (1982 & Supp. IV 1986). The presumption of validity does not apply in the reexamination process. See *Adelman, Federal Circuit, supra* note 9, at 993 n.54. The Federal Circuit has recently expanded the scope of reexaminations by effectively making them available even when the patent is in litigation. See *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1426-28 (Fed. Cir. 1988). The effect of this decision will be that the PTO will have the opportunity to rule on validity even for prior art patents and publications that were not before the PTO during the original examination. See *Patlex Corp. v. Quigg*, 680 F. Supp. 33, 37 (D.D.C. 1988) (stating that the reexamination statute is limited to reexamination of patentability based on prior art patents and publications).

¹⁴⁸ This is the basis for calling a patent a monopoly. For a general theoretical analysis of the basis for this profound difference between the two forms of intellectual property, see *Adelman, Property Rights Theory and Patent-Antitrust: The Role of Compulsory Licensing*, 52 N.Y.U. L. Rev. 977, 983-987 (1977).

¹⁴⁹ See, e.g., *State Indus., Inc. v. A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985) ("One of the benefits of the patent system is its so-called 'negative incentive' to 'design around' a competitor's products . . .").

¹⁵⁰ See *supra* note 147.

¹⁵¹ For a discussion of the role of disclosure in patent law, see *Eisenberg, Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177, 207-17 (1987).

¹⁵² This system was followed by France until 1968. See *Mathely, supra* note 10, at 169. Copyright systems throughout the world follow this procedure. See 3 M. NIM-

whole nature of the right granted under copyright is inherently more amorphous for that reason.

Patent law provides protection for specifically claimed inventions, while copyright protection is accorded to the expression, but not the ideas, that constitute novels, poems, films, and the like. Expression is inherently different from the claimed invention, and it may make sense to have a standard in copyright law that protects the exact expression and anything that is "substantially similar" to it. It would be virtually impossible to have a claiming system for novels, poems, and films unless the exact and precise expression served as the "claim" that limited the scope of protection.

The issue before the Court in *Graver Tank* was whether the claims of a patent defined the ambit of patent protection. By focusing on the need to prevent copying in copyright law, by assuming that such a need had relevance to patent law, and by effectively importing a "substantial similarity" standard into patent law, the Court basically assumed its conclusion that the claims of a patent do not define the scope of patent protection. There was no illicit copying or "piracy" in *Graver Tank*. The Court effectively held that, when there is substantial similarity between the claimed invention and the accused device, then there is a "piracy" or "fraud on the patent." Moreover, the defendant's substitution of manganese silicate could not be viewed as an insubstantial variation.

2. Narrowing Claims

Although *Graver Tank* is considered to be the modern articulation of the doctrine of equivalents, it did not present the typical situation involving the use of the doctrine of equivalents. Both the majority and dissent believed that the doctrine of equivalents was being used to broaden a claim.¹⁵³ *Graver Tank*, however, really represented a situation in which a patent was narrowed.

The *Graver Tank* decision involving the doctrine of equivalents was a rehearing of an earlier decision in which the Court had held invalid certain other claims that were broad enough to cover the flux using manganese silicate.¹⁵⁴ The specification of the patent in issue dis-

MER, *supra* note 7, § 17.08 (1987).

¹⁵³ The majority believed that the doctrine of equivalents was applied in order to broaden the scope of the claim. See *Graver Tank*, 339 U.S. at 607-08. The dissent argued that broadening reissue was the proper way to achieve this end. See *id.* at 615 (Black, J., dissenting) (discussing *Edward Miller & Co. v. Bridgeport Brass Co.*, 104 U.S. 350, 353-54 (1881)).

¹⁵⁴ See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 336 U.S. 271, 276-77

closed nine metallic silicates, of which manganese silicate was one, that could be used in the flux. The claim covered metallic silicates generally. The district court held that the claim was invalid because it covered metallic silicates that could not be used in the flux.¹⁵⁵ The court of appeals reversed the district court, adopting a narrower construction of the claims because "there was nothing in the record to show that the [patentee] intended . . . to assert a monopoly broader than the nine metallic silicates named in the specifications."¹⁵⁶ The Supreme Court refused to allow the court of appeals to construe the claims as thus narrowed and reversed, reinstating the district court's finding of invalidity.¹⁵⁷

Generally, application of the doctrine of equivalents results in the broadening of a claim to cover something that was not passed on by the PTO during the initial examination process and the consequent expansion of claim coverage. In the earlier *Graver Tank* decision, the Court held invalid claims granted by the PTO that would have covered flux using manganese silicate. Thus, had the Court affirmed the decision of the court of appeals, which had held the claim valid as narrowed to the nine metallic silicates disclosed in the specification, there would have been no need to rely on the doctrine of equivalents.

The various uses of the doctrine of equivalents can be illustrated by two hypotheticals built upon modifications of *Graver Tank*. Hypothetical one assumes that the patent disclosed only the four alkaline earth metal silicates, which, at the time of filing, were the only ones known to be effective. The patent was then issued with only the alkaline earth silicates claims, drafted in precisely the same way as the claims held to be valid by the Supreme Court. Later, the accused flux was discovered, and it was determined that the flux made from manganese silicate functioned almost exactly as the one using magnesium silicate. Arguably, the discovery of the functioning of manganese silicate may even be patentable over the teachings of the patent-in-suit. Under the facts of this hypothetical, the patent specification would not support

(1949). Curiously, Justice Douglas apparently believed that the broad claim in the earlier *Graver* decision was invalidated because there was expired prior art that involved manganese silicate. See *Graver Tank*, 339 U.S. at 618 (Douglas, J., dissenting). This view appears to be incorrect in light of the earlier *Graver Tank* decision and the fact that the court of appeals had allowed the broad claim as narrowed to the nine metallic silicates disclosed in the specification. Presumably, the court of appeals would have had to pass on that narrowed claim for patentability purposes and conclude that the narrowed claim was valid.

¹⁵⁵ See *Linde Air Prods. Co. v. Graver Tank & Mfg. Co.*, 86 F. Supp. 191, 198 (N.D. Ind. 1947).

¹⁵⁶ *Graver Tank*, 336 U.S. at 276.

¹⁵⁷ See *id.* at 277.

a claim that would literally cover a flux using manganese silicate. Hence, the failure to obtain such a claim could not be due to a mistake.¹⁵⁸

Hypothetical two assumes that once one skilled in the art proved the efficacy of magnesium silicate, she would know, without the need for "undue experimentation,"¹⁵⁹ that manganese silicate would be effective as well. The patent specification would therefore support a claim that incorporated manganese silicate, whether or not that chemical was specifically mentioned as a substitute for magnesium silicate. Under such circumstances, the failure to claim manganese silicate could well be due to a mistake. A claim that did incorporate manganese silicate, however, would be broader than one limited to alkaline earth silicates. This form of the hypothetical covers a large number of cases in which the doctrine of equivalents is applied.¹⁶⁰

¹⁵⁸ Although cases of this type in which the doctrine of equivalents is applied are not common, a modern example is *Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 750 F.2d 1569 (Fed. Cir. 1984). The court stated that "devices changing the patented invention with advances developed subsequent to the patent could infringe under the doctrine of equivalents." *Id.* at 1581.

¹⁵⁹ Case law interpreting § 112, paragraph 1, requires that the patent specification teach one skilled in the art to practice the claimed invention without the need for "undue experimentation." *See id.* at 1576 ("To be enabling under § 112, a patent must contain a description that enables one skilled in the art to make and use the claimed invention. . . . [T]he amount of experimentation, however, must not be unduly extensive."); *White Consol. Indus., Inc. v. Vega Servo-Control, Inc.*, 713 F.2d 788, 791 (Fed. Cir. 1983) (noting that "a disclosure is sufficient even if . . . one skilled in the art would be able to select or develop a suitable translator without undue experimentation").

¹⁶⁰ *See, e.g.*, *Great N. Corp. v. Davis Core & Pad Co.*, 782 F.2d 159, 165-66 (Fed. Cir. 1986) (noting the need to consider the "scope and content of the prior art [and] the ordinary skill in the art . . . [to determine if] the patentee's product may be treated as an equivalent of what is claimed . . . even though a case of literal infringement is not established"); *Yarway Corp. v. Eur-Control USA, Inc.*, 775 F.2d 268, 274-75 (Fed. Cir. 1985) (stating that "[i]f the invention as patented eliminates evasion, evidently any approach to the tangential configuration would have a favorable effect towards that end" and be equivalent to the patent specification); *Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 938 (Fed. Cir. 1983) ("The invention would not have been obvious to one of ordinary skill in the art . . ."); *Thomas & Betts Corp. v. Litton Sys., Inc.*, 720 F.2d 1572, 1579 (Fed. Cir. 1983) ("[T]he test of equivalency extends beyond what is literally stated in a patentee's specification to be equivalent and encompasses any element which one of ordinary skill in the art would perceive as interchangeable with the claimed element."); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1361-62 (Fed. Cir. 1983) ("[A]n accused product that does not literally infringe a structural claim may yet be found an infringement [if it is an] . . . equivalent[] of the inventions set forth in the claims interpreted in light of the prior art."); *Caterpillar Tractor Co. v. Berco, S.p.A.*, 714 F.2d 1110, 1115 (Fed. Cir. 1983) (ruling that, although "it is clear that Caterpillar did not present a claim defining [the innovation of the claimed invention,] . . . [t]o limit Caterpillar to a literal reading of the claims would in this case 'convert the protection of the patent grant into a hollow and useless thing'" (quoting *Graver Tank*, 339 U.S. at 607)).

The *Graver Tank* Court did not really broaden the patent so that the claims covered something that they did not cover before. Although the Court earlier had refused to allow the broad claim that covered all metallic silicates to be narrowed to cover a flux using manganese silicate, the use of the doctrine of equivalents effectively accomplished the same result by allowing the patent holder to use the doctrine of equivalents to recapture part of what was in that broader claim. The use of the doctrine of equivalents in *Graver Tank* was, therefore, distinguishable from the common use of the doctrine.

3. "Insubstantial" Change

The *Graver Tank* Court suggested that only "insubstantial" changes would be encompassed by the doctrine of equivalents.¹⁶¹ Subsequent judicial decisions, including those of the Federal Circuit, have repeated this position.¹⁶² There are two points, however, that seem to be relevant with respect to the Court's "limitation" of the doctrine of equivalents. First, it is difficult to understand exactly what the Court meant by "insubstantial" in the context of *Graver Tank*. Even if one does not accept the dissent's position fully, it is difficult to see how the Court could find that the substitution of a nonalkaline earth metal for the claimed alkaline earth metal is "insubstantial." This observation is equally applicable to the great majority of equivalents cases. The differences between the claimed invention and the accused device can rarely be deemed to be "trivial" or "insubstantial" as these expressions are used in ordinary language.¹⁶³

¹⁶¹ See *Graver Tank*, 339 U.S. at 610.

¹⁶² See *supra* notes 98-99 and accompanying text.

¹⁶³ See, e.g., *Under Sea Indus. v. Dacor Corp.*, 833 F.2d 1551, 1557-58 (Fed. Cir. 1987) ("Although many of the tests show that the [accused device] did not function in the same way as the [device] claimed in the patent, in a number of tests it did so function."); *Great N. Corp. v. Davis Core & Pad Co.*, 782 F.2d 159, 165-66 (Fed. Cir. 1986) ("Although we cannot say that it is beyond question that [the accused device] is an equivalent . . . —and we hesitate to expand this doctrine too far, to the point where patent counsel cannot rely at all on what the claims recite when advising on infringement—it is clear to us that . . . Rollrider is an equivalent."); *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 870 (Fed. Cir. 1985) ("[G]iven the difference, would the accused composition at 90°C. and the claimed invention at room temperature perform substantially the same function . . . in substantially the same way . . . to give substantially the same result . . ."); *Datascope Corp. v. SMEC, Inc.*, 776 F.2d 320, 325-26 (Fed. Cir. 1985) ("Although the district court characterized that difference [between the claimed invention and accused device] as 'an improvement,' it held that it . . . is substantially the same."); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1361-62 (Fed. Cir. 1983) (holding as sufficient support of the doctrine of equivalents the finding that "in constructing its S/E spacecraft, the government . . . merely employed a modern day computer to do indirectly what [the accused device did] directly"); *Caterpillar Tractor Co. v. Berco, S.p.A.*, 714 F.2d 1110, 1115 (Fed. Cir. 1983) (stating that equiv-

Second, despite the Court's limitation to "insubstantial" variation, the actual test for equivalents—does the accused device perform substantially the same function in substantially the same way to achieve substantially the same result—suggests a broader range than the Court's limitation implies. Many nontrivial variations still may result when an accused device is deemed substantially similar to a claimed invention. The "insubstantial" variation concept is not part of the equivalents formulation, and jury instructions do not focus on whether a change is "substantial." As discussed above, the doctrine of equivalents in *Graver Tank* was explicitly linked to concerns grounded in copyright law.¹⁶⁴ The phrasing of the equivalents test reflects this

alence was found because the record did not establish that the difference between the accused device and the claimed invention "affects either the mode of operation or the result obtained").

The doctrine is confusing because the range of equivalents allowed by the courts is frequently said to vary with the degree of invention. "Pioneer" inventions are entitled to a broad range of equivalents, while "improvements" are limited to a narrow range of equivalents. See *Graver Tank*, 339 U.S. at 608 ("The doctrine [of equivalents] operates not only in favor of the patentee of a pioneer or primary invention, but also for the patentee of a secondary invention . . . although the area of equivalence may vary under the circumstances."); *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1532 (Fed. Cir. 1987) ("A pioneer invention is entitled to a broad range of equivalents. . . . [A] 'non-pioneer' invention may be entitled to some range of equivalents . . ."); *Thomas & Betts Corp. v. Litton Sys., Inc.*, 720 F.2d 1572, 1580 (Fed. Cir. 1983) ("[W]hile a pioneer invention is entitled to a broad range application of the doctrine of equivalents, an invention representing only a modest advance over the prior art is given a more restricted (narrower range) application of the doctrine.").

The pioneer/nonpioneer distinction has little analytical content. There is no reason why variations in the scope of the claims under patent law rules cannot deal with the nature of the invention. A pioneer invention can be claimed broadly because there is little prior art to constrict the scope of the claims. A non-pioneer invention can only be claimed narrowly because, if claimed broadly, the claim would read on the prior art. In *Texas Instruments, Inc. v. United States International Trade Commission*, 846 F.2d 1369 (Fed. Cir. 1988), Judge Newman explained the meaning of pioneer in patent law as follows:

The Supreme Court in *Westinghouse v. Boyden Power Brake Co.* characterized a pioneering invention as "a distinct step in the progress of the art, distinguished from a mere improvement or perfection of what had gone before". [sic] Courts early recognized that patented inventions vary in their technological or industrial significance. Indeed, inventions vary as greatly as human imagination permits.

There is not a discontinuous transition from "mere improvement" to "pioneer". [sic] History shows that the rules of law governing infringement determinations are amenable to consistent application despite the variety of contexts that arise. The judicially "liberal" view of both claim interpretation and equivalency accorded a "pioneer" invention is not a manifestation of a different legal standard based on an abstract legal concept denominated "pioneer". [sic] Rather, the "liberal" view flows directly from the relative sparseness of prior art in nascent fields of technology.

Id. at 1370 (citations omitted).

¹⁶⁴ See *supra* notes 126-27 and accompanying text.

relationship. The "substantial similarity" standard in copyright, however, has a far broader scope than a "trivial" variation standard would suggest.

The next Section considers the uses of the doctrine of equivalents in order to determine whether the doctrine is really a *necessary* feature of patent law.

B. *Uses of the Doctrine of Equivalents*

The justification for the doctrine of equivalents is that it would be unfair to deprive an inventor of the benefits of her invention when an infringer makes, uses, or sells a product or process that is not identical to, but is substantially similar to, the claimed invention. This justification raises a question: Why did the inventor not claim originally that item that she seeks to cover through the doctrine of equivalents? There are two plausible answers. First, the doctrine of equivalents is used in those instances in which the patent holder has inadvertently omitted to include a broader claim or, second, because of a technological development that occurs after the patent issues, it would have been impossible for the inventor to have obtained a claim that would cover the infringer's action due to the technical rules of patent law. Oddly, those two functions rely on theories that are to some degree opposite to each other.

Most frequently, patent holders use the doctrine of equivalents to rectify what is effectively a "mistake" in the process of drafting and prosecuting the application in the PTO. The patent holder argues that the failure to include something in the claim was an oversight. For example, in *Perkin-Elmer Corp. v. Westinghouse Electric Corp.*,¹⁶⁵ the patent holder maintained unsuccessfully that the tap-coupling and loop-coupling were interchangeable according to those skilled in the art.¹⁶⁶ This argument amounts to the position that, although the patent claimed tap-coupling, and although the disclosure taught tap-coupling in order to enable those skilled in the art to make or use the invention, the patent also enabled those skilled in the art to make or use the invention with loop-coupling.¹⁶⁷ In such a situation, a patent holder may

¹⁶⁵ 822 F.2d 1528 (Fed. Cir. 1987).

¹⁶⁶ See *supra* notes 105-12 and accompanying text. This was the argument used successfully in *Graver Tank*, 339 U.S. at 609 ("An important factor [in determining equivalents] 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.").

¹⁶⁷ This notion of enablement is part of the statutory requirement of disclosure. See 35 U.S.C. § 112 (1982). For brief discussions of the enablement requirement, see *supra* notes 2 & 159.

reasonably argue that what she is trying to capture through the doctrine of equivalents does not really exceed what the invention is. This same argument is made in any equivalents case in which the patent holder argues that those skilled in the art would, at the time of the patent application, have regarded the relevant element or elements in the accused device as interchangeable with the claimed invention.¹⁶⁸

The second primary use of the doctrine of equivalents involves new developments or technologies that come into existence after the patent issues. This second use involves a theoretical predicate that is opposite to the first use. The patent holder argues that those skilled in the art could not have regarded the relevant feature or features of the accused device as interchangeable with the claimed invention because the accused device is the product of new technology. This situation resembles hypothetical one, above, in which a flux using manganese silicate was developed after the filing of the patent application, and one skilled in the art at the time of filing would not have known that manganese silicate could be readily substituted for magnesium silicate.¹⁶⁹

A modern example may be found in *Hughes Aircraft Co. v. United States*.¹⁷⁰ Hughes created a system for "attitude control" of a satellite in order to orient the satellite in space.¹⁷¹ The Hughes invention taught an on-board sun sensor that transmitted sun pulses back to earth so that the ground crew could simulate the rotation of the satellite and calculate spin rate, sun angle, and ISA position, which is "the measure of where the satellite is in its spin cycle at any instant of time."¹⁷² The ground crew would then send signals to the satellite that caused the satellite's jet valves to discharge pulses of gas that would reorient the satellite in space. The jets would fire synchronously upon

¹⁶⁸ This appeal to "those skilled in the art" suggests some connection to the non-obviousness requirement for the patentability of a product. See 35 U.S.C. § 103 (West Supp. 1988) (providing that an invention is not patentable if it "would have been obvious . . . to a person having ordinary skill in the art"). It has been held, however, that the patentability, and thus the non-obviousness, of a product does not settle the equivalency inquiry. See *Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 750 F.2d 1569, 1580-81 (Fed. Cir. 1984) ("[W]here defendant has appropriated the material features of the patent in suit, infringement will be found 'even when those features have been supplemented and modified to such an extent that the defendant may be entitled to a patent for improvement.' . . . It is not a requirement of equivalence, however, that those skilled in the art know of the equivalence when the patent application is filed or the patent issues." (quoting *Bendix Corp. v. United States*, 199 U.S.P.Q. (BNA) 203, 221-22 (Ct. Cl. Trial Div. 1978))).

¹⁶⁹ See *supra* note 158 and accompanying text.

¹⁷⁰ 717 F.2d 1351 (Fed. Cir. 1983). One of the authors testified as a patent expert in the accounting phase of this case.

¹⁷¹ See *id.* at 1353.

¹⁷² *Id.* at 1360. This measure of where the satellite is in its spin cycle was called "ISA" or "instantaneous spin angle" position. See *id.* at 1357.

receipt of the firing signals transmitted by the ground crew. The satellite was a "dumb" satellite because all control information was relayed to the earth, and the jet on board the spacecraft fired promptly upon receiving a firing pulse from the earth.¹⁷³ In the accused satellites, commonly known as store-and-execute satellites, sun pulses were transmitted to an on-board computer, which then calculated the spin rate of the satellite. The computer also "knew" when it received sun pulses, so it could respond to signals that told it to fire the jet a certain number of seconds from the time it received a sun pulse indication. The information from the sun sensors was also sent to earth. The ground crew then sent a set of signals to the satellite. One signal told the computer how many times to fire the jet, and the second told the computer the number of seconds after receiving a sun pulse to wait before it fired the jet.¹⁷⁴ The claims in suit were limited to the details of a "dumb" satellite.

The Federal Circuit found that the doctrine of equivalents applied to the store-and-execute satellites because the development of new technology—advanced computers and digital communications techniques—made possible the replacement of certain functions of the ground crew by functions performed by the computer aboard the spacecraft.¹⁷⁵ In contrast to the *Graver Tank* hypothetical, the specification in *Hughes* probably would have supported claims that did not require the firing pulse information to be received synchronously with the firing of the jet; it also would have embraced providing an indication of the instantaneous spin angle either to the on-board computer or to the ground. The ability to draft such a claim in *Hughes* is grounded in the

¹⁷³ See *id.* at 1353.

¹⁷⁴ See *id.* at 1360-61.

¹⁷⁵ The majority adopted the position of the Court of Claims, which had "thrice made clear, that partial variation in technique, an embellishment made possible by post-[patent] technology, does not allow the accused spacecraft to escape the 'web of infringement.'" *Id.* at 1365 (quoting *Bendix Corp. v. United States*, 600 F.2d 1364, 1382 (Ct. Cl. 1979); citing *Decca Ltd. v. United States*, 544 F.2d 1070, 1080-81 (Ct. Cl. 1976); *Eastern Rotorcraft Corp. v. United States*, 397 F.2d 978, 981 (Ct. Cl. 1968)).

In certain respects, *Hughes* bears a striking resemblance to *Pennwalt*. In *Pennwalt*, the issue was whether a computer memory for storage of weight and color data was equivalent to the hard-wired position-indicating means in the claimed invention. In *Hughes*, the patent explicitly claimed a means for providing to an external location—the ground crew—an indication of the position of the satellite in its spin cycle. The accused device did not perform this function, instead transmitting sun pulses to its on-board computer, which then calculated the position of the satellite in its spin cycle and transmitted other information to the external location. Nevertheless, the Federal Circuit found an equivalent in *Hughes* and distinguished *Pennwalt* because it did "not involve later-developed computer technology which should be deemed within the scope of the claims to avoid the pirating of an invention." *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 938 (Fed. Cir. 1987) (in banc), *cert. denied*, 108 S. Ct. 1226 (1988).

proposition that mechanical and electrical inventions are generally viewed as a product of the predictable arts and that one embodiment will generally support a broad generic claim. In contrast, the *Graver Tank* technology most likely would have been viewed as a product of the unpredictable arts, and numerous examples would be needed to support a broad claim.¹⁷⁶ Thus, merely providing evidence of the efficacy of four alkaline earth metal silicates would not have been sufficient evidence of the efficacy of manganese silicate.

These two broad categories of uses of the doctrine of equivalents, error and new technology, are logically separate. The "error" part of the doctrine relies on a theory of actual enablement, so that the patent actually enables those skilled in the art to make or use the variation that the patent holder seeks to encompass within the doctrine of equivalents. The patent holder is really arguing that the claimed invention, when understood by someone skilled in the art, would cover the accused device. The patentee could have obtained a claim that was specific to the accused device, because adding details concerning the device to the specification would not have constituted new matter. In the "new technology" context, the patent cannot teach the actual enablement,

¹⁷⁶ While 35 U.S.C. § 112, para. 1 (1982), requires an enabling disclosure, it is settled that the scope of the enabling disclosure must be commensurate with the scope of the claim. Hence, a broad claim requires under some circumstances a more expansive disclosure than a narrow claim. It is generally understood that, when the technology is unpredictable, more disclosure is necessary to support a broad claim than when the art is predictable. See *In re Spectra-Physics, Inc. v. Coherent, Inc.*, 827 F.2d 1524, 1533 (Fed. Cir. 1987) ("If an invention pertains to an art where the results are predictable, . . . a broad claim can be enabled by disclosure of a single embodiment."); *In re Cook*, 439 F.2d 730, 734 (C.C.P.A. 1971) (pointing out that, in the case, "a dichotomy between predictable and unpredictable factors in any art . . . [was] at the heart of much of the argument" that a single operative example was entitled to a broad claim).

This differentiation is illustrated in the PTO examination manual. See PATENT & TRADEMARK OFFICE, U.S. DEPARTMENT OF COMMERCE, MANUAL OF PATENT EXAMINING PROCEDURE § 706.03(z) (5th ed. rev. 9, 1988). The manual provides patent examiners with the following instructions:

In applications directed to inventions in arts where results are predictable, broad claims may properly be supported by the disclosure of a single species.

However, in applications directed to inventions in arts where the results are unpredictable, the disclosure of a single species usually does not provide an adequate basis to support generic claims. This is because in arts such as chemistry it is not obvious from the disclosure of one species, what other species will work. *In re Dreshfield* gives this general rule: "It is well settled that in cases involving chemicals and chemical compounds, which differ radically in their properties it must appear in an applicant's specification either by the enumeration of a sufficient number of the members of a group or by other appropriate language, that the chemicals or chemical combinations included in the claims are capable of accomplishing the desired result."

Id. (citations omitted).

which becomes possible only as the result of technological development. Thus, adding to the specification of the patent the details concerning the accused device would be new matter and hence impermissible. Under patent law rules, no claim could have been obtained to the specific embodiment of the accused device. Whether a broad claim that would cover both the original teachings and the new technology would be enabled would then depend on the predictable or not predictable nature of the art to which the invention pertains.

C. *Legitimacy of the Uses of the Doctrine of Equivalents*

It is generally agreed that any use of the doctrine of equivalents conflicts with the notion that the claims define the scope of patent protection; given the importance of claims in the patent system, such conflict should be avoided in all but a very few cases.¹⁷⁷ It becomes crucial to ask whether the doctrine should continue to be used to derogate from the claiming system or whether other patent law doctrines can accommodate the concerns of the patent holder while ensuring that the public may rely on patent claims for defining the scope of patent protection.

As discussed above, the doctrine of equivalents is used most frequently by patent holders who mistakenly did not claim more broadly during the prosecution of the patents.¹⁷⁸ The patent system, however, allows for very broad claims. For example, the availability of functional claims provides considerable flexibility for an inventor to obtain broad means-plus-function claims.¹⁷⁹ In light of this flexibility, a patent holder's attempt to invoke the doctrine of equivalents to cover anything more than the most trivial variation must represent a recognition that the patent holder mistakenly failed to cover the element originally, or that she intentionally did not claim more broadly because of patentability concerns. In the latter case, the patent holder should be prohibited from using the doctrine of equivalents to capture what was intentionally not claimed in the application process.¹⁸⁰

¹⁷⁷ See *supra* notes 32-39 and accompanying text.

¹⁷⁸ See *supra* notes 165-68 and accompanying text.

¹⁷⁹ Functional claiming is provided for by 35 U.S.C. § 112, para. 6 (1982) ("An element in a claim for a combination may be expressed as a means or step for performing a specified function"); see also *infra* notes 204-25 and accompanying text (discussing functional claims). Broad protection can sometimes be achieved without the use of functional claims. For example, an apparatus claim that covered a "screwdriver" would provide very broad protection. One may argue, however, that, upon close examination, many words in our language define functional concepts, and a claim on a "screwdriver" is effectively a functional claim because it describes, although not in the usual functional language, a means for inserting screws.

¹⁸⁰ The intention to disallow broader claiming when an applicant has intentionally claimed more narrowly in order to obtain a patent animates the doctrine of prose-

The difficulty with using the doctrine of equivalents to "fix" mistakes is that the patent law already provides such a mechanism in the reissue procedure. To this extent, the doctrine of equivalents is nothing more than the circumvention of a statutory procedure, and, more seriously, it is the circumvention of explicitly stated statutory protection for members of the public who may have relied on the original claims.

The reissue procedure, which allows the patent holder to return to the PTO in order to "amend" a patent, was originally a judicial doctrine¹⁸¹ that was codified in the patent statute in 1832.¹⁸² The procedure was reaffirmed by Congress in the 1952 Act.¹⁸³ The reissue procedure is designed to deal with three situations. First, if the original claims are too broad and, therefore, invalid,¹⁸⁴ the patent holder must seek to narrow the claims. This is called a narrowing reissue. Second, if the original claims are too narrow and, therefore, fail to provide to the inventor that which is actually enabled by the patent, the patent holder may seek to broaden the claims.¹⁸⁵ This is called a broadening reissue. Third, if the patent contains "a defective specification or drawing," the patent holder may seek reissue to cure that defect.¹⁸⁶

The reissue statute provides that the error that occasions reissue must occur "without any deceptive intention."¹⁸⁷ The "error" involved

cution history estoppel. See *supra* notes 30-31 and accompanying text.

¹⁸¹ A reissue was first sanctioned by the Supreme Court in 1832. See *Grant v. Raymond*, 31 U.S. (6 Pet.) 218 (1832). The Court had to decide whether "to cancel a patent which had once been issued, and to grant a second patent for the same invention, with an amended specification . . . Upon this question, there is not known a single case where the point has been expressly decided in the United States. . . ." *Id.* at 236. The Court approved of the reissue, reasoning "[c]an it be supposed, that the law ever intended to punish their [patentees'] ignorance in drawing a very special legal paper, by a forfeiture of all the advantages of their invention?" *Id.*

¹⁸² See Act of July 3, 1832, ch. 162, § 3, 4 Stat. 559.

¹⁸³ See 35 U.S.C. §§ 251-252 (1982).

¹⁸⁴ Invalidity of the patent is an affirmative defense to an action for infringement. See 4 D. CHISUM, *supra* note 1, § 19.02. The courts will not narrow an overbroad claim to save it from invalidity. See *Graver Tank*, 336 U.S. at 277.

¹⁸⁵ The test for whether a claim on reissue broadens or enlarges the scope of the claims in the original patent has been stated as whether the claim on reissue "contains within its scope any conceivable apparatus or process which would not have infringed the original patent." *In re Ruth*, 278 F.2d 729, 730 (C.C.P.A. 1960). If a claim sought to be reissued is narrower in one respect, but enlarged or broadened in others, it is treated as a broadening reissue. See *Tillotson, Ltd. v. Walbro Corp.*, 831 F.2d 1033, 1037 & n.2 (Fed. Cir. 1987). The distinction between narrowing and broadening reissues is important because of the two-year limitation period allowed for broadening reissues. See *infra* note 191 and accompanying text.

¹⁸⁶ See 35 U.S.C. § 251 (1982); see also *Parker v. Brown & Root*, 198 F. Supp. 795, 798 (S.D. Tex. 1961) (noting that the purpose of a reissue patent is to correct obvious errors in drafting drawing).

¹⁸⁷ 35 U.S.C. § 251 (1982).

may be of fact, law, or judgment.¹⁸⁸ The PTO may reissue a patent only "for the invention disclosed in the original patent, and in accordance with a new and amended application, for the unexpired part of the term of the original patent."¹⁸⁹ Further, the patent holder may not introduce any "new matter"¹⁹⁰ into the application for reissue and must seek a reissue that enlarges the claim of the original patent, as opposed to narrowing it, within two years from the grant of the original patent.¹⁹¹

If the reissued patent is granted, the original patent is effectively cancelled except "to the extent that [the claims of the reissued patent] are identical with the original patent."¹⁹² The patent statute, as of the 1952 Act, explicitly recognizes in two senses the concept of "intervening rights."¹⁹³ First, the statute provides that there is an absolute right to continue to use or sell a "specific thing" made, purchased, or used prior to the grant of the reissue patent unless there has been an infringement of a valid claim in the original patent that survives the reissue process.¹⁹⁴ Second, the statute provides that, under terms that the court

¹⁸⁸ See 3 D. CHISUM, *supra* note 1, § 15.03[2][b].

¹⁸⁹ 35 U.S.C. § 251 (1982).

¹⁹⁰ *Id.*; see also 35 U.S.C. § 132 (1982) (disallowing the introduction of "new matter" upon reexamination of an application for a patent). "New matter" is "new, substantive matter, such as would have the effect of changing the invention, or of introducing what might be the subject of another application for a patent." *Siebert Cylinder Oil Corp. v. Harper Steam Lubricator Co.*, 4 F. 328, 333 (C.C.D. Conn. 1880) (citation omitted). If matter is not disclosed in the original patent, then it is new matter.

¹⁹¹ See 35 U.S.C. § 251 (1982). There is no similar limitation period for narrowing reissues. Prior to the explicit two-year period, broadening reissues required that the patent holder exercise "diligence." See *Edward Miller & Co. v. Bridgeport Brass Co.*, 104 U.S. 350, 352 (1881).

¹⁹² 35 U.S.C. § 252 (1982).

¹⁹³ See 35 U.S.C. § 252 (1982). "Intervening rights" are the rights of those who have acted in reliance on the claims as originally set forth to continue, although their actions violate the patent as reissued. See *Wayne-Gossard Corp. v. Sondra, Inc.*, 434 F. Supp. 1340, 1352 (E.D. Pa. 1977), *aff'd*, 579 F.2d 41 (3d Cir. 1978). See generally Federico, *Intervening Rights in Patent Reissues*, 30 GEO. WASH. L. REV. 603, 603-37 (1962) (illustrating the evolution of the "intervening rights" doctrine); Silverman, *To Err is Human—Patent Reissues and the Doctrine of Intervening Rights*, 48 J. PAT. OFF. SOC'Y 696, 713-22 (1966) (analyzing the superimposition of the "intervening rights" doctrine upon the basic framework of reissue validity). Intervening rights may be necessary to satisfy due process. *Cf. supra* note 39 and accompanying text (noting due process concerns arising out of patent law). If the scope of the reissued claim and the original claim is identical, then, with respect to that claim, there would be no intervening rights. It is not necessary that identical words be used. See, e.g., *Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 810 F.2d 1113, 1116-17 (Fed. Cir. 1987) (noting that the standard to be applied is whether the scope of the claims is substantially identical, not whether there has been any word change); *Kaufman Co. v. Lantech, Inc.*, 807 F.2d 970, 976-78 (Fed. Cir. 1986) (stating that the language in reissue claims is identical with regard to substance and effect and is therefore legally "identical").

¹⁹⁴ See 35 U.S.C. § 252 (1982); see also 3 D. CHISUM, *supra* note 1, § 15.05[2] (discussing intervening rights with respect to a "specific thing" under § 252).

"deems equitable for the protection of investments made or business commenced before the grant of the reissue," the court may allow the "continued manufacture, use or sale" of the protected item, or practicing of a process, if the making, using, or purchase occurred before reissue, even if only "substantial preparation" for making, using, or purchasing occurred before reissue.¹⁹⁵

In the typical situation involving the doctrine of equivalents, the patent holder is trying to obtain claims that are broader than those that were actually granted by the PTO. What is particularly curious is that, in *Graver Tank*, the patent holder was not seeking a broadening reissue, but was attempting to narrow a claim that covered all metallic silicates, and was therefore invalid, in order to cover only those metallic silicates, including the manganese silicate, disclosed in the specification.¹⁹⁶ The difference is crucial, because one objection to the use of the doctrine of equivalents is that it extends the scope of a patent to cover something the patentability of which has not been reviewed by the PTO. This objection may not be made in the context of the narrowing reissue involved in *Graver Tank*.

Evidence that the use of the doctrine of equivalents is, most typically, an attempt to obtain a "judicial" broadening reissue follows from a comparison of the reissue process and the doctrine of equivalents. The reissue process is explicitly limited to "the invention disclosed in the original patent," and the applicant cannot introduce any "new matter."¹⁹⁷ When an applicant seeks to use the doctrine of equivalents based on the fact that those skilled in the art would view the element(s) in the accused device as interchangeable with that in the claimed invention, she is not trying to go beyond the scope of the original invention, but is arguing that the original patent actually enabled those skilled in the art to make or use the invention with the accused element.¹⁹⁸ Simi-

¹⁹⁵ 35 U.S.C. § 252 (1982); see also 3 D. CHISUM, *supra* note 1, § 15.05[3] (discussing equitable intervening rights under § 252).

¹⁹⁶ See *supra* notes 154-57 and accompanying text.

¹⁹⁷ 35 U.S.C. § 251 (1982). Before 1952, courts required the reissue applicant to show that what was sought to be covered by the reissue was intended to have been covered in the original patent. See, e.g., *United States Indus. Chems., Inc. v. Carbide & Carbon Chems. Corp.*, 315 U.S. 668, 676 (1942) (defining the required intention). The Federal Circuit has diminished the significance of the intent test for determining whether the reissue is indeed limited to "the invention disclosed in the original patent." See, e.g., *In re Hounsfeld*, 699 F.2d 1320, 1322-24 (Fed. Cir. 1983) (lack of "intent to claim" is not an independent basis for denying a reissue application under § 251). The Federal Circuit has distinguished the "intent" inquiry from the disclosure requirements of § 112. Compliance with the description and enablement provisions of § 112 does not automatically mean that the requirements of § 251 are met. See *In re Weiler*, 790 F.2d 1576, 1581-82 (Fed. Cir. 1986).

¹⁹⁸ See *supra* note 103.

larly, the theory of a broadening reissue is that the reissue may not exceed the original invention. This theory does not suggest that an applicant meets the requirements of the reissue statute merely by demonstrating that the description and enablement provisions of section 112 are met. The reissue applicant must also show that the failure to include the broadened version of the claim was an error.¹⁹⁹ Although a showing of error is not a requirement for invoking the doctrine of equivalents, the typical patent holder who relies on the doctrine of equivalents has unintentionally neglected to claim more broadly.

There are two reasons why patent holders are reluctant to use the reissue process instead of relying on the doctrine of equivalents. First, most patent holders who would seek to use the doctrine of equivalents want to broaden, not narrow, claims, and they would face the two-year limitation period for broadening reissues.²⁰⁰ Second, defendants subject to the use of the doctrine of equivalents would in many cases hold intervening rights under the reissue statute.²⁰¹ As compelling as these reasons may seem from the perspective of the patent holder, they do not justify the use of the doctrine of equivalents when it circumvents the reissue procedure. The reissue procedure, which allows for amendment and reissue, accommodates the patent holder who has made a mistake in the scope of her claim. The use of the doctrine of equivalents to upset this statutorily crafted compromise cannot be justified.²⁰²

¹⁹⁹ See 35 U.S.C. § 251 (1982). The close relationship between satisfying the requirements of disclosure and enablement and the "error" requirement of § 251 may account for why the error issue merges into the issue of disclosure support. See *In re Peters*, 723 F.2d 891, 894 (Fed. Cir. 1983). Nevertheless, the Federal Circuit has held that a reissue applicant who satisfies the disclosure requirements of § 112 does not automatically satisfy the "intent to claim" or "error" standards of § 251, see *In re Weiler*, 790 F.2d 1576, 1581-82 (Fed. Cir. 1986), although the Federal Circuit has interpreted the "error" requirement very broadly, see *In re Wilder*, 736 F.2d 1516, 1519 (Fed. Cir. 1984); *Ball Corp. v. United States*, 729 F.2d 1429, 1437 (Fed. Cir. 1984).

²⁰⁰ See *supra* note 191 and accompanying text. In some instances, a continuation application may be used to escape the two-year limitation for broadening reissues imposed by § 251. A continuation application is a second application that contains continuity of disclosure, is copending with the patent application before the PTO, contains cross-references to the patent application, and involves identity of inventorship. See 35 U.S.C. § 120 (1982). See generally 3 D. CHISUM, *supra* note 1, § 13.01-.07 (discussing the requirements for continuation applications). If the inventor can satisfy the requirements for a continuation, it may have the practical effect of allowing her more than two years to broaden claims. The practice of using continuations to avoid the time limitation of § 251, however, has been challenged, albeit unsuccessfully. See *Bott v. Four-Star Corp.*, 675 F. Supp. 1069, 1078 (E.D. Mich. 1987), *aff'd*, 848 F.2d 145 (Fed. Cir. 1988).

²⁰¹ See *supra* notes 193-95 and accompanying text.

²⁰² The same argument may be applied to the use of continuing applications that avoid the issue of intervening rights. See *supra* note 200 and accompanying text.

This argument does not suggest that the reissue procedure is appropriate for every case, especially in light of the two-year limitation on broadening reissues. The solution, however, is for Congress to repeal the two-year limitation and treat broadening and narrowing reissues alike. The Federal Circuit has stated that “[t]he purpose of the law that a broadening reissue must be applied for within two years after patent grant is to set a limited time after which the public may rely on the scope of the claims of an issued patent.”²⁰³ As long as the doctrine of intervening rights is enforced rigorously, however, the public will not be harmed by broadening reissues over the life of the patent. Moreover, whatever greater uncertainty would result from liberalizing the reissue rules would be more than offset by a decrease in the uncertainty engendered by use of the doctrine of equivalents.

The reissue procedure is not the only mechanism available to meet the concerns that animate the use of the doctrine of equivalents. Prevention of error through the use of broad functional claims in the original application can obviate the need for many reissues. The patent statutes explicitly permit the use of claims in the form of a means-plus-function.²⁰⁴ For example, in *Pennwalt*, the patent holder had described the shift register device as a means for indicating position.²⁰⁵ The advantage to the patent holder of using a functional claim instead of a broadening reissue as an alternative to the doctrine of equivalents is that there are no “intervening rights” to stand in the way of infringement suits brought by the patent holder.

Although functional claims have been used by patent applicants since the nineteenth century, they were not always sanctioned by statute and as freely available to patent holders as they are today. In *Halliburton Oil Well Cementing Co. v. Walker*,²⁰⁶ the Supreme Court held

²⁰³ *In re Fotland*, 779 F.2d 31, 33 (Fed. Cir. 1985), *cert. denied*, 476 U.S. 1183 (1986).

²⁰⁴ See 35 U.S.C. § 112; see also Manzo, “Means” Claims in Patent Infringement Litigation, 68 J. PAT. & TRADEMARK OFF. SOC’Y 97, 105-10 (1986) (discussing the Federal Circuit’s recent clarification of the scope of “means” claims); Moy, *The Interpretation of Means Expressions During Prosecution*, 68 J. PAT. & TRADEMARK OFF. SOC’Y 246, 247-52, 266-80 (1986) (comparing favorably the statutory method of interpreting means expression to the PTO method).

²⁰⁵ See *Pennwalt Corp. v. Durand-Wayland, Inc.*, 225 U.S.P.Q. (BNA) 558, 569 (N.D. Ga. 1984).

²⁰⁶ 329 U.S. 1 (1946). In *Halliburton*, Lehr and Wyatt had invented a sound-echo time apparatus to measure the distance from the top of an oil well to the fluid surface in order to place accurately oil pumps for wells that lacked sufficient natural pressure to force the oil to gush. The apparatus used a gas cylinder with a valve that injected a short blast of gas into the well. The patent provided for measuring the time between the release of the gas and the return of the echo of the sound waves produced by the gas. The problem with the Lehr-Wyatt device was that it was based on the erroneous premise that the velocity of sound in an oil well was the same as the velocity

that certain functional claims were overbroad and ambiguous,²⁰⁷ thereby continuing a similar line of criticism in earlier cases.²⁰⁸ Nevertheless, *Halliburton* has to be listed as one of a series of the Supreme Court's antipatent decisions in the postwar period.²⁰⁹ If the *Halliburton* invention was the use of an element that performed as defined by the functional element in that combination, then any element that performed the function defined in the claimed combination should be considered to infringe. On the other hand, if the real invention was the specific mechanical element used to perform the defined function, then the invention was not in the use of any element, but in the one that was disclosed, and the *Halliburton* claim should have been struck down as lacking invention (non-obviousness in modern parlance). The patent law is still living with the consequences of this ill-advised Supreme Court decision.

In response to the decision in *Halliburton*, Congress amended the

in the open air, and the Lehr-Wyatt computation proved to be inaccurate. *See id.* at 3-5. A subsequent inventor, Walker, observed that an oil flow pipe is jointed with collars or shoulders, and that there are projections on the oil flow pipe known as tubing catchers. Walker's idea was that by observing and recording shoulder echo waves and multiplying the number of shoulders observed by the known length of a pipe section, he could determine the distance to the tubing catcher. He could then use that distance to determine the distance to the surface of the oil by comparing the time of an echo to the tubing catcher to the time of an echo to the fluid surface. *See id.* at 5-6. Walker used the Lehr-Wyatt apparatus and added a mechanical acoustical resonator, which would "amplify [the] echo waves and eliminate unwanted echoes from other obstructions thus producing a clearer picture of the shoulder echo waves." *Id.* at 7. Although the Lehr-Wyatt apparatus could record all of the echo waves Walker found relevant, Lehr and Wyatt had never recognized the usefulness of these echoes. Walker's patent contained method claims and product claims covering the combination of a device to identify shoulder waves with the Lehr-Wyatt apparatus. *See id.* at 6-7. The Supreme Court held that the claims of the Walker patent failed "adequately to depict the structure, mode, and operation of the parts in combination." *Id.* at 8. The Court added:

A claim typical of all of those held valid only describes the resonator and its relation with the rest of the apparatus as "means associated with said pressure responsive device for tuning said receiving means to the frequency of echoes from the tubing collars of said tubing sections to clearly distinguish the echoes from said couplings from each other." The language of the claim thus describes this most crucial element in the "new" combination in terms of what it will do rather than in terms of its own physical characteristics or its arrangement in the new combination apparatus. We have held that a claim with such a description of a product is invalid as a violation of [the patent statute].

Id. at 8-9.

²⁰⁷ *See id.* at 8-14.

²⁰⁸ *See* General Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364, 368-75 (1938) (holding that the claim was vague and indefinite and therefore invalid); Holland Furniture Co. v. Perkins Glue Co., 277 U.S. 245, 257-58 (1928) (concluding that the claim was overbroad because it covered an embodiment not disclosed in the specification).

²⁰⁹ *See* Adelman, *Federal Circuit*, *supra* note 9, at 984-86.

patent laws to provide for functional claims.²¹⁰ Under section 112, paragraph 6, a patent applicant can now express an element in a claim for a combination as "a means or step for performing a specified function" without reciting the particular means to achieve that function as long as a means is disclosed in the patent.²¹¹ If a means is disclosed, then the functional "claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."²¹² Functional claiming has the potential to remove the need to rely on the doctrine of equivalents, except in those circumstances in which broad functional claims cannot be used because of the difficulty in the unpredictable arts of meeting the enablement requirement.²¹³ If the applicant has an invention of broad scope, then in most cases the applicant can claim functionally and obviate the need to rely on the doctrine of equivalents.

One feature of functional claims, however, prevents relying on these claims as an alternative to the doctrine of equivalents. As presently interpreted, the concept of functional claims itself incorporates the concept of equivalents. Eliminating reliance on the doctrine of equivalents in favor of functional claiming would, therefore, dilute the full benefit of generating greater certainty in the interpretation of patent claims. The notion of equivalents occurs in a specific form in the

²¹⁰ In 1952, Congress added the following paragraph to § 112:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Act of July 19, 1952, Pub. L. No. 82-593, § 112, para. 3, 66 Stat. 792, 798-99 (codified as amended at 35 U.S.C. § 112, para. 6 (1982)). See generally Federico, *Commentary on the New Patent Act*, 35 U.S.C.A. 1, 25-26 (West 1954) (discussing changes in patent law under § 112). It is generally thought that, before *Halliburton*, functional claiming was allowed under at least some circumstances. See, e.g., *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405, 417-22 (1908) (recognizing a claim for a "mechanical means to bring into working relation" a "folding plate" and a "cylinder"). The Court in *Halliburton* distinguished *Continental*, see *Halliburton*, 329 U.S. at 13-14, but "a considerable body of case law, if not the preponderance thereof, before the *Halliburton* case interpreted broad statements of structure . . . plus a statement of function in the manner now sanctioned by the statute." *In re Fuetterer*, 319 F.2d 259, 264 n.11 (C.C.P.A. 1963).

²¹¹ 35 U.S.C. § 112, para. 6 (1982).

²¹² *Id.*

²¹³ Functional claims may not be as useful with some types of inventions as with others. For example, in the "unpredictable arts," such as chemical patents, it is difficult to use functional claims to claim broadly. See, e.g., *In re Fisher*, 427 F.2d 833, 839 (C.C.P.A. 1970) ("In cases involving unpredictable factors, such as most chemical reactions and physiological activity, the scope of enablement obviously varies inversely with the degree of unpredictability of the factors involved."). For a discussion of the difference between the predictable and unpredictable arts, see *supra* note 176.

context of functional claims and presents the same problems of interpretation.

The doctrine of equivalents intersects with functional claims in two ways. First, under section 112, paragraph 6, a functional claim may be literally infringed when the function performed by the accused device is exactly the same, but the means used by the accused device is merely equivalent to the means disclosed in the patented invention.²¹⁴ This notion of equivalents is distinguished from the general doctrine of equivalents, but it is basically the same concept.²¹⁵ The section 112 use of equivalents has been interpreted to mean that, in deciding whether a functional claim is infringed, it is necessary to import limitations from the specification consisting of the disclosed structure and equivalents.²¹⁶ The scope of a functional claim cannot be determined until the claim is applied in an infringement suit, because it is only then that the range of equivalent means will be determined.²¹⁷ There is, therefore, the same type of uncertainty in determining whether there is literal infringement of a functional claim as there is in determining whether the doctrine of equivalents applies as a general matter. Second, a functional claim may, as a whole and not merely the means, be infringed under the doctrine of equivalents when the accused device does not perform liter-

²¹⁴ See 35 U.S.C. § 112, para. 6 (1982).

²¹⁵ The two uses of equivalents—§ 112 equivalents and the doctrine of equivalents—are, strictly speaking, separate in that § 112 equivalence is relevant only in the discussion of the literal infringement of functional claims. As the Federal Circuit has stated, “the word ‘equivalent’ in § 112 should not be confused . . . with the ‘doctrine of equivalents.’” *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1575 (Fed. Cir. 1985). The conceptual concerns, however, are the same. See *Texas Instruments, Inc. v. United States Int’l Trade Comm’n*, 805 F.2d 1558, 1571 (Fed. Cir. 1986) (“Whether the issue is equivalency of a means . . . or equivalency to the claimed invention as a whole . . . the test is the same three-part test of history: does the asserted equivalent perform substantially the same function in substantially the same way to accomplish substantially the same result?”).

There has been a great deal of confusion about the relationship of equivalents under § 112, paragraph 6, and the doctrine of equivalents as a general doctrine. See Harris, *supra* note 17, at 104-07. Harris argues that “[p]resent [Federal Circuit] case law does not offer clear guidance as to whether, when the differences between the accused device and the claimed invention concern means-plus-function elements of the patent claim, proper equivalence analysis should employ the classical doctrine of equivalents, the § 112 equivalence doctrine, or *both*.” *Id.* at 106. To the extent that this issue was unclear before *Pennwalt*, the majority made clear that when claims with functional elements are involved, literal infringement analysis requires resort to § 112 equivalence, and equivalent infringement analysis requires resort to the general doctrine of equivalents. See *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 933-36 (Fed. Cir. 1987) (in banc), *cert. denied*, 108 S. Ct. 1226 (1988).

²¹⁶ See *Pennwalt*, 833 F.2d at 933-34.

²¹⁷ See *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 974-76 (Fed. Cir. 1985); *D.M.I.*, 755 F.2d at 1573-74. See generally *Manzo*, *supra* note 204 (discussing the test for determining when a means-plus-function claim is infringed).

ally the same function, but performs an equivalent of that function.²¹⁸ An accused device may infringe a functional claim even though neither the function nor the means is the same as that of the patented device.²¹⁹

Despite the use of the "equivalents" notion in section 112, paragraph 6, it is not necessary to read in the limitations consisting of the disclosed structure and equivalents in order to interpret a functional claim literally. Indeed, we believe the same result for the ultimate question can be reached by a more straightforward approach.

The range of equivalent means need not be interpreted to determine whether a functional claim is literally infringed for two reasons. First, there is authority for the view that, in interpreting a functional claim for purposes of determining whether the claim is patentable, limitations should not be imported from the specification. For example, in *In re Lundberg*,²²⁰ the Court of Customs and Patent Appeals held that the novelty of a claim had to be tested by reference to the functional claim itself, not by reference to whether the claim would be novel when limited by the equivalent of what was disclosed in the specification.²²¹

²¹⁸ See, e.g., *Pennwalt*, 833 F.2d at 934-36 ("Under the doctrine of equivalents, infringement may be found . . . if an accused device performs substantially the same overall function or work, in substantially the same way, to obtain substantially the same result as the claimed invention.").

²¹⁹ The more broadly the courts interpret the doctrine of equivalents, the more expansive will be the scope of functional claims. This scope can apply the expansive effect of the doctrine of equivalents in two places: the means disclosure and the function itself.

²²⁰ 244 F.2d 543 (C.C.P.A. 1957).

²²¹ See *id.* at 547-48; see also *In re Queener*, 796 F.2d 461, 464 (Fed. Cir. 1986) (Newman, J., concurring) ("[I]t is the language itself of the claims which must particularly point out and distinctly claim the subject matter which the applicant regards as his invention . . ." (quoting *In re Lundberg*, 244 F.2d 543, 548 (C.C.P.A. 1957))). But see *Polaroid Corp. v. Eastman Kodak Co.*, 789 F.2d 1556, 1570 (Fed. Cir.) (using language that suggests that the court may have read limitations from the specification into the claims for purposes of determining patentability under § 112, paragraph 6), *cert. denied*, 107 S. Ct. 178 (1986).

Lundberg represents the correct interpretation of § 112, paragraph 6. This section should be viewed as a legislative codification of the reverse doctrine of equivalents. See *infra* notes 222-23 and accompanying text. Thus, the question of how to treat subsequent technical developments is addressed in the context of broad claims by the reverse doctrine of equivalents. See *supra* note 130. In the absence of such a doctrine, an inventor would be able to cover future developments that were verbally embraced by her claims, but were truly outside the scope of her invention. When dealing with prior art, however, inventors should be required to define patentably over that art. There is, therefore, no need to permit a resort to equivalents to narrow a claim that otherwise fails to define patentably over the prior art. The appropriate means for dealing with such a problem is the usual one applicable to all claims that are overly broad: narrowing them either by amendment or, after issuance, by reissue or reexamination, for limitations may not be read into claims from the specification according to the settled jurisprudence of the Federal Circuit. See *Sjolund v. Musland*, 847 F.2d 1573, 1582 (Fed. Cir. 1988). Thus, if *Polaroid* actually permitted reading limitations from the specification into the claims, it was wrongly decided.

Similarly, it is unnecessary for determination of literal readability to use the doctrine of equivalents to import limitations into functional claim language in the infringement context.

Second, although the legislative history is sparse,²²² the reference to the "equivalents" in section 112, paragraph 6, should mean that functional elements in combination claims are literally readable if the claim language applies, when it is properly construed in keeping with the specification and prosecution history, but the actual infringement is not present when the reverse doctrine of equivalents applies, which happens when the accused device has a functionally defined element that functions in a substantially different manner from the corresponding element disclosed in the specification. There is no reason to read section 112, paragraph 6, as requiring an equivalents inquiry as a necessary part of every interpretation of a functional claim for literal infringement purposes. If a combination to achieve a function is patentable without any resort to the specification, then an inquiry into equivalent means for purposes of determining literal readability is a confusing and irrelevant distraction. It is confusing to both the patent owner and the patent defendant. The only option for a defendant who is faced with literal readability under such circumstances would be to invoke successfully the reverse doctrine of equivalents.²²³ Although this

We are not suggesting, however, that the overall policy expressed by the Federal Circuit is necessarily correct. There is an argument for permitting the reading of limitations from the specification into the claims to save them from invalidity. After all, the PTO has already passed on the patentability of the broad claim. Thus, in the PTO, the applicant would have had only to draft a series of narrower claims to add features from the specification into the broad claim. Such claims would be allowed as a matter of course. Consequently, there would be no need for reading limitations from the specification into the broad claim. Given the routine nature of such more limited claims, we can ask why a court should not be able to do what could have been done in the PTO without further examination. There is, of course, the matter of intervening rights, but such equitable rights would not arise if the law gave notice that elements from the specification could be read into the claims to save them from invalidity.

²²² See 2 D. CHISUM, *supra* note 1, § 8.04[2][a].

²²³ For an explanation of the reverse doctrine of equivalents, see *supra* note 130. The Federal Circuit has seemingly rejected the approach suggested in the text. See *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 846 F.2d 1369, 1372 (Fed. Cir. 1988) (On Petition for Rehearing). Judge Davis recognized, however, that the court's approach looked like the reverse doctrine of equivalents, but was not labeled such because the court persists in defining literal readability as something other than literal readability: the disclosed element plus equivalents. Under the court's approach, the literal meaning of the claim is not the literal meaning of the claim. Hence, the use of the reverse doctrine of equivalents to avoid infringement even when the claim literally reads would not be applicable because, under the court's approach, what literally reads does not literally read, so there is no need for the reverse doctrine of equivalents.

The court's decision is unfortunate, because the reverse doctrine of equivalents is fundamentally designed to deal with technology developed after the filing date of the patent, although we suggest, see *supra* note 130, that perhaps the issue date would be

approach would not change the result reached by the application of existing case law, it would restore to the term literal its commonly understood meaning.

Functional claiming obviates the need for the overwhelming number of uses of the doctrine of equivalents. As discussed above, there is no need to continue to use the section 112 equivalents notion to import limitations from the specification into claim language for the purpose of a literal infringement analysis. Forcing a patent applicant who believes she has an invention with a broad scope to claim broadly through functional claims would eliminate the possibility of an inventor choosing to claim narrowly in the PTO to avoid problems with obtaining her patent, then argue to a jury for a broad construction of the patent under the doctrine of equivalents.

If an applicant has combined components into a patentable invention, with at least one component defined functionally, then she should receive a patent on that invention that is functionally claimed. Such a functional claim should cover any structure that includes an element that performs the defined function, because it is the function performed in the claimed combination that represents the invention, subject to an equivalence inquiry that properly should be labeled one of reverse equivalents.²²⁴

As discussed above, patent holders who rely on the doctrine of equivalents frequently argue that an element of the accused device should fall within the range of equivalents because a person skilled in the art at the time of the invention would have viewed the element as interchangeable with the element claimed.²²⁵ This theory makes sense if functional claiming is restricted, because the only alternative is to put every embodiment in the specification and then write the claims to cover each embodiment. Such an alternative is not feasible, and the substitutability rule makes sense in that context. If, however, broad functional claiming is permitted and the patent covers virtually any structure that performs a particular function, subject to a meaningful reverse equivalents test, then such a rule no longer makes sense. Indeed, if the doctrine of equivalents would be needed at all, it would be only to pro-

more appropriate. Technology in existence at least prior to the date of the invention is not involved because functional claims are read literally when prior art is involved. See *supra* note 221 and accompanying text. Thus, the court has lost an opportunity to clarify the role of § 112, paragraph 6, in the interpretation of functional claims.

²²⁴ Broad functional claiming would not apply to "single-means" claims, which are claims that "cover[] every conceivable means for achieving the stated result." *In re Hyatt*, 708 F.2d 712, 714 (Fed. Cir. 1983). Such claims are invalid as overbroad. See *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 112-13 (1833).

²²⁵ See *supra* note 103 and accompanying text.

tect patent holders from unforeseeable technological developments that occur after the patent issues and so were not understood as interchangeable at the time of the invention.

This recommendation is not to suggest that every unforeseeable development will result in an application of the doctrine of equivalents. In some cases, an accused device that rests on a technological development that occurred after the issuance of the patent-in-suit could well have been embraced by a broad functional claim that would have been supported by the specification. Nevertheless, the doctrine of equivalents is necessary only in a context in which the unpredictability of the art would have made it impossible to have obtained broad claims to cover new technical developments. Most likely, this restriction would not embrace situations like the one in *Hughes*,²²⁶ because Hughes could have attempted in the PTO to obtain enabled claims that would have covered both the disclosed dumb satellite and the accused store-and-execute systems. We would limit the applicability of the doctrine of equivalents to situations such as those discussed previously in connection with a hypothetical version of *Graver Tank*.²²⁷

We recognize, of course, that the reason why a claim to the accused product or process was unavailable to the patentee cuts strongly against in effect granting that claim under the doctrine of equivalents. The rules governing the permissible scope of a claim that may be granted by the PTO, however, are somewhat arbitrary. For example, in *In re Hogan*,²²⁸ the Court of Customs and Patent Appeals permitted a broad claim even when faced with non-enabled technology, because that technology was developed after the filing date. Had that technology been developed before the filing date, but after the invention date, then the claim would not have been permitted. While one may argue that this reasoning shows that *Hogan* was wrongly decided, the technical rules of patent law should not always determine the permissible reach of a patent. Thus, in appropriate circumstances, the development of new technology should be treated as within the proper ambit of the patent. A court should not expand the patent lightly and probably should not delegate that function to a jury; most likely, a jury would not have the technical or legal sophistication to carry out such a delicate task.

²²⁶ See *supra* notes 170-74 and accompanying text. There is some indication that the after-developed technology referred to in *Hughes* was available before the time the Federal Circuit thought, but what is relevant is that the court regarded the technology as unavailable to Hughes' inventor.

²²⁷ See *supra* note 158 and accompanying text.

²²⁸ 559 F.2d 595 (C.C.P.A. 1977); see also *supra* note 130 (discussing *Hogan*).

Finally, the above analysis may be criticized because it assumes a repeal of the two-year limitation on broadening reissues that has not as yet occurred. The two-year statute, however, does represent congressional policy, albeit a seriously flawed policy. The better view is to remain faithful to that error while seeking its repeal. The better dodge would be to permit the use of continuation applications for this purpose, because at least such applications give the PTO the opportunity to pass on any broadening of the claims.²²⁹

IV. CONCLUSION

In *Pennwalt*, the Federal Circuit in banc purported to decide an issue crucial to the scope of patent protection: Does the doctrine of equivalents apply on an element-by-element basis or on an entirety basis? The majority chose the element-by-element approach in an apparent attempt to limit the reach of the doctrine of equivalents. Although both the majority and the dissent obviously thought that the debate was important, the crucial issue involved in the doctrine of equivalents is not the question that the court answered, but the one that it did not: What is an equivalent? The Federal Circuit seems prepared to allow the doctrine of equivalents to play a major role as a factual issue to be decided in every case, but the court has yet to address the meaning of this fundamental concept.

The doctrine of equivalents was originally intended to prevent "fraud on the patent," but the doctrine presently mirrors the "substantial similarity" concept in copyright law. The differences between the two types of intellectual property raise serious questions about whether the "substantial similarity" standard should be applied to the claiming system of patent law, the sole function of which is to ensure that inventions are described with particularity and specificity. The doctrine of equivalents serves two roles in patent law. First, it allows a patentee to cover an accused device when the patentee has omitted to claim what her patent enabled. Second, it ensures that patent protection is not eviscerated by technology developed after the patent issues when claims that would cover the technology literally are unavailable under reissue and were unavailable during the original prosecution. The second purpose, applied only in special circumstances, represents the sole legitimate function of the doctrine. In other circumstances, the balance should be drawn in favor of the public.

Inventors need to know with some certainty what they can and

²²⁹ See *supra* note 200.

cannot do. The law should seek to accommodate this interest so long as it can be done while doing justice. We have shown in this Article that justice can be achieved in almost all cases without the use of the doctrine of equivalents. Hence, it should receive a proper burial from the Federal Circuit except and to the extent that no other just doctrine is available.

