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PENNWALT CORP. v. DURAND-WAYLAND, INC.—THE FEDERAL CIRCUIT REDEFINES THE DOCTRINE OF EQUIVALENTS

INTRODUCTION

Courts analyze patent infringement¹ questions by looking at the literal language of the patent claims² and determining whether the alleged infringer's device or product falls within the scope of the claims.³ Additionally, the courts have developed an equitable doctrine which finds infringement where the accused device or composition of matter performs substantially the same function, in substantially the same way, to obtain substantially the same result, as the claimed invention.⁴ This is the Doctrine of Equivalents ("the Doctrine").⁵

The courts, in applying the Doctrine have refined it and shaped it into its present form. One of the first refinements to the Doctrine was to extend its application from cases involving mechanical devices to cases involving compositions of matter.⁶ A number of other refinements have developed as well:

1. The Patent Act, 35 U.S.C. §§ 1-376, (1982 and Supp. III 1985) defines the requirements necessary to obtain a patent and the rights of the patentee under the Act. In particular, 35 U.S.C. § 154 provides that "[e]very patent shall contain . . . a grant to the patentee, his heirs or assigns, for the term of seventeen years, . . . the right to exclude others from making, using, or selling the invention throughout the United States, . . ." and 35 U.S.C. § 271(a) (1982), provides that "whoever without authority makes, uses or sells any patented invention, within the United States during the term of the patent therefor, infringes the patent."

2. A patent is required to contain "one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112 (1982). A claim consists of a preamble, transition and one or more elements. An element is a limitation or narrowing of the scope of the claim. 4 D. CHISUM, PATENTS § 18.03[4] (1986). Therefore, claims define the invention for purposes of infringement. 2 D. CHISUM, PATENTS § 8.01. See *infra* note 34 for a discussion of claim style development.

3. This is literal infringement. See, e.g., *Builders Concrete, Inc. v. Bremerton Concrete Prods. Co.*, 757 F.2d 255, 257 (Fed. Cir. 1985) ("[l]iteral infringement requires that the accused device embody every element of the claim.").

4. *Graver Tank & Mfg. Co., Inc. v. Linde Air Prods. Co.*, 339 U.S. 605 (1950) (where devices perform equivalent functions, though form may be different, infringement occurs); *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853) (where device substantially embodies patent's mode of operation and achieves same result infringement occurs).

5. See 6 LIPSCOMB, LIPSCOMB'S WALKER ON PATENTS § 22:34-49 (3d ed. 1987) (discussion of origins and scope of the Doctrine).

6. *Minerals Separation v. Butte Mining Co.*, 250 U.S. 336, 354 (1919) (defendant avoided infringement by using more than 1% oil, whereas patent called for use of fraction of 1% oil); *Tyler v. Boston*, 74 U.S. (7 Wall.) 327, 330 (1869); (in holding that substitution of 72 parts of naphtha was not equivalent to 28 parts of kerosene, the court stated, "[t]his term 'equivalent,' when speaking of machines, has a certain definite meaning; but when used with regard to the

1) the Doctrine may be used against the patentee as well as in favor of the patentee, that is, the reverse doctrine of equivalents;⁷ 2) the Doctrine applies to both pioneer, major improvement, and, minor improvement patents, although the allowed range of equivalents depends on the degree of improvement;⁸ and, 3) the range of allowed equivalents must be determined in view of the file wrapper or prosecution history and the prior art.⁹

As the Doctrine entered the 1980's, a question arose as to whether infringement under it should be determined by looking at the invention as a whole or on an element-by-element basis. Since 1983, the United States Court of Appeals for the Federal Circuit¹⁰ has used both methods to determine infringement under the Doctrine,¹¹ thus creating inconsistency in the test

chemical action of such fluids as can be discovered only by experiment, it only means equally good.'"). See also 4 D. CHISUM, *supra* note 2, § 18.02 [1]-[2]. But see *Graver Tank*, 339 U.S. at 612 (holding that substitution of manganese for patentee's magnesium infringed plaintiff's patent); *Chadeloid Chem. Co. v. Frank S. De Ronde Co.*, 146 F. 988, 993 (C.C.S.D.N.Y. 1906) (holding that substitution of acetone for alcohol infringed plaintiff's patent).

7. The reverse doctrine of equivalents excuses accused devices that fall within the literal language of the claims, when the accused device performs the same function in a substantially different way. *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 569 (1898).

A modern example of the reverse doctrine of equivalents is *Leesona Corp. v. United States*, 530 F.2d 896 (Ct. Cl. 1976). In *Leesona*, the claims in suit related to an electrode for a battery. Although the accused electrode fit the description of the electrode in the claims, the court found that the accused electrode was not intended to perform the function of the patented electrode and in fact did not perform the same function as the patented electrode. Therefore, the court found no infringement. *Id.* at 905-06.

8. *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405, 414-15 (1908) (range of equivalents depends upon and varies with degree of invention, such as, pioneer improvement).

9. The file wrapper is the Patent and Trademark Offices's official record of the proceedings on a patent application. The official record of the proceedings is also referred to as the prosecution history of the patent application. File wrapper and prosecution history have come to mean the same thing and will be used interchangeably. The Doctrine of File Wrapper Estoppel precludes a patentee from reclaiming subject matter in a claim which he surrendered during prosecution. *Exhibit Supply Co. v. Ace Patents Corp.*, 315 U.S. 126, 136 (1942). It is also well-known that file wrapper estoppel supersedes the Doctrine. *Lewis v. Avco Mfg. Corp.*, 228 F.2d 919, 923 (7th Cir. 1956). However, file wrapper estoppel does not entirely preclude the use of the Doctrine. *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1362 (Fed. Cir. 1983). See also *Southern Textile Mach. Co. v. United Hosiery Mills Corp.*, 33 F.2d 862, 886 (6th Cir. 1929) ("the estoppel should go no further than to bar the patentee from reliance upon the cancelled claim in its broadest or generic construction."). For a detailed analysis of file wrapper estoppel, see 4 D. CHISUM, *supra* note 2, § 18.05 (1986).

10. See *infra* notes 68-69 and accompanying text for discussion of the creation of the Court of Appeals for the Federal Circuit.

11. Compare *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1568-69 (Fed. Cir. 1986), *reh'g denied*, 846 F.2d 1369, 6 U.S.P.Q.2d 1886, *reh'g denied en banc*, 7 U.S.P.Q. 2d 1414 (Fed. Cir. 1988) (no infringement found when invention as a whole was considered) and *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1364 (Fed. Cir. 1983) (the Doctrine applies to invention as a whole) with *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528 (Fed. Cir. 1987) (employing element-by-element analysis and finding no infringement) and *Lemelson v. United States*, 752 F.2d 1538, 1551 (Fed. Cir. 1985) (stating that it is "well settled" that infringement under the Doctrine requires presence of every element or its substantial equivalent).

used to determine infringement.¹²

The Federal Circuit resolved this inconsistency in favor of an element-by-element analysis in the case of *Pennwalt Corp. v. Durand-Wayland Inc.*¹³ In *Pennwalt*, the Federal Circuit reviewed the issues of literal infringement and infringement under the Doctrine¹⁴ and found the patent infringed under neither analysis.¹⁵ Nonetheless, the majority established an analytical test to determine infringement under the Doctrine. The dissent, however, accused the majority of contravening Supreme Court precedent in establishing its test.¹⁶ The *Pennwalt* decision evoked strong feelings among the justices, as evidenced not only by the majority and dissenting opinions, but by the additional views¹⁷ and commentary¹⁸ filed by two of the justices.

This Casenote will demonstrate that the Federal Circuit's element-by-element test for infringement under the Doctrine not only overrules several Federal Circuit precedents but also in essence overrules a United States Supreme Court precedent. This Casenote will also discuss how the Federal Circuit, in creating an analytical test, has essentially transformed the test for infringement under the Doctrine into a modified version of the test for literal infringement. Finally, this Casenote will examine how the adoption of the element-by-element test will affect patent law in general and infringement litigation in particular.

I. BACKGROUND

A. Historical Development of the Doctrine of Equivalents

Article I, section 8 of the United States Constitution empowers Congress to promote science and the useful arts by granting authors and inventors the exclusive right to their respective writings and discoveries for a limited time.¹⁹ Based on this provision of the Constitution, Congress has enacted

12. Harris, *Three Ambiguities of the Doctrine of Equivalents in the Federal Circuit*, 69 J. PAT. OFF. SOC'Y 91 (1987). The three ambiguities referred to by the author are: 1) varying statements of the basic test, such as, achieves substantially the same result versus achieves the same result; 2) element-by-element comparison versus invention as a whole comparison; and, 3) relationship between the Doctrine and the 35 U.S.C. § 112 equivalence doctrine. *Id.* at 91-92.

13. 833 F.2d 931 (Fed. Cir. 1987), *cert. denied*, 108 S. Ct. 1226, *cert. denied*, 108 S. Ct. 1474 (1988).

14. 833 F.2d at 933-39.

15. *Id.* at 939.

16. *Id.* at 945 (dissent alleged that majority's opinion departed from teachings of *Graver Tank*).

17. *Id.* at 949-54 (Nies, J., additional views).

18. *Id.* at 954 (Newman, J., commentary).

19. U.S. CONST. art. I, § 8, cl. 8 states: "[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."

and amended laws which regulate the granting and enforcement of patents.²⁰ In general, United States patent laws grant an inventor the right to exclude others from making, using, or selling his invention within the United States.²¹ Therefore, anyone who makes, uses, or sells a patented invention throughout the United States during the term of the patent (seventeen years), infringes the patent.²²

Literal infringement of a patent occurs when the accused device or composition possesses all the elements present in one or more claims of a valid patent.²³ In addition, a court may find infringement under the Doctrine even though a device or composition does not fall within the literal meaning of a patent claim. The Doctrine allows expansion of the claims beyond their literal meaning in order to ensure that a potential infringer does not circumvent a patent by merely changing the form of an invention while copying its substance.²⁴

The Doctrine first appeared in the Supreme Court case of *Winans v. Denmead*.²⁵ The *Winans* patent involved a railroad coal car in the shape of a cone,²⁶ whereas the defendant constructed coal cars that were octagonal in shape.²⁷ A sharply-divided Supreme Court (5-4) reversed the decision of the lower court and found that defendant's coal car did infringe the *Winans* patent.²⁸ The majority in *Winans* stated that where form and function are separable, it is the duty of the court to look through the form to the substance of the invention.²⁹ Here it would be unreasonable to apply the

20. The first patent statute was the Act of 1790, Ch. 7 § 1, 1 Stat. 109, 109-10 (1790). This was followed by the 1793 Act, the 1832 Act, the 1870 Act, and the 1952 Act. See *infra* note 34 for more details.

21. 35 U.S.C. § 154 (1982). See *supra* note 1 for text of statute.

22. 35 U.S.C. § 271(a) (1982). See *supra* note 1 for text of statute.

23. See *supra* note 3.

24. But see *General Dynamics Corp. v. Whitcomb*, 443 F.2d 630 (4th Cir. 1971) (differences in form and shape weigh importantly in the balance where form is the essence of invention); *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853) (when form and substance are inseparable, it is enough to look at form only).

25. 56 U.S. (15 How.) 330 (1853).

26. The claim of the *Winans* patent read:

What I claim as my invention, and desire to secure by letters patent, is making the body of a car for the transportation of coal, etc., in the form of a frustum of a cone, substantially as herein described, whereby the force exerted by the weight of the load presses equally in all directions, and does not tend to change the form thereof, so that every part resists its equal proportion, and by which, also, the lower part is so reduced as to pass down within the truck frame and between the axles, to lower the centre of gravity of the load without diminishing the capacity of the car as described.

Id. at 340.

27. *Id.* at 341.

28. *Id.* (district court held that patentee's claim was limited to particular form mentioned in specification, such as, conical, and because defendant's car was not conical, there was no infringement).

29. *Id.* at 343 ("[t]he 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 proportion.").

term “cone” literally, because the car’s storage departments were basically circular in shape. The question the Court focused on was: how close to a circle must a car be in order to infringe?³⁰ The majority answered the question by stating that a car must be close enough to a circle to substantially embody the patentee’s mode of operation and attain the same kind of result as the patentee’s invention.³¹ Applying this test to the case, the *Winans* Court found that the octagonal shape was substantially the same as the circular shape, attained the same kind of result as the patented invention, and therefore infringed the patented invention.³²

Justice Campbell, author of the dissent, argued that the patent should be limited to the circular shape, as in literal infringement.³³ The dissent pointed to the then existing patent law which required a patentee to particularly specify and point out what he claimed as his invention.³⁴ Since the plaintiff

30. *Id.* at 343-44. “In practice, deviations from a true circle will always occur. How near to a circle, then, must a car be in order to infringe? May it be slightly elliptical, or otherwise depart from a true circle, and, if so, how far?” *Id.*

31. *Id.* at 344 (“[i]n our judgment, the only answer that can be given to these questions is, that it must be so near to a true circle as substantially to embody the patentee’s mode of operation, and thereby attain the same kind of result as was reached by his invention.”).

32. *Id.*

33. *Id.* at 347 (Campbell, J., dissenting) (reason for limiting patentee to circular form was that only that form was specifically claimed).

34. *Id.* The Patent Act of 1836, ch. 357, § 6, 5 Stat. 117 (1836), provided that an applicant for patent “shall particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery.” It should be pointed out that claims and patent examination were first required by the Patent Act of 1836. A detailed historical perspective of the United States patent statutes may be found in 1 A.W. DELLER, PATENT CLAIMS, § 1-11 (2d ed. 1971). A brief historical summary is present here so that the reader may better understand the reasoning employed by the courts in these cases.

The first United States patent statute was the Act of 1790 which required a specification in writing. The specification was required to contain a description and explanation of the invention in such particular detail as to not only distinguish the invention from other things before known and used but to enable a person skilled in the art to make, construct or use the invention. Act of 1790, ch. 7, § 1, 1 Stat. 109, 109-10 (1790). The Patent Act of 1793 provided that an inventor deliver a written description of his invention which distinguished it from all other things before known. The 1793 Act also allowed a defendant in an infringement suit the defenses of lack of novelty and prior use. Patent Act of 1793, ch. 11, §§ 3, 6, 1 Stat. 318 (1793) (novelty means new or not previously known by others in United States; prior use of an invention is one that must be accessible to public, for example, no attempt to conceal or keep invention secret).

As stated above in this footnote, the Patent Act of 1836 first required the presence of claims and examination of patent applications. However, as shown in note 26, *supra*, the claims merely stated the broad features of a patentee’s invention with a phrase such as “substantially herein described.” The drawings and specifications were the main features of the patent. 1 A.W. DELLER, PATENT CLAIMS §§ 4, 9 (2d ed. 1971). Infringement was still determined by looking at the specification. It was not until 1870 that an inventor was required to particularly point out and distinctly claim his invention. Patent Act of 1870, ch. 230, § 26, 16 Stat. 198, 201 (1870). Thus, the Patent Act of 1870 began the move toward specificity of claims and increased the importance of claims versus the specification. It is now accepted that it is the claims and not the specification which determine the subject matter of the invention. *See, e.g.*, Application of

confined his claim to conical form and did not mention any other form in the specification, the dissent reasoned that the defendant's car did not infringe the *Winans* patent.³⁵ The dissent also believed that the policy adopted by the majority would be injurious to labor and increase the volume of litigation.³⁶

Later decisions have refined the *Winans* definition of the Doctrine. One refinement is that although various classes of inventions are entitled to protection under the Doctrine, the range of equivalents allowed each class of invention will be different.³⁷ Inventions are generally divided into three classes or categories:³⁸ 1) pioneer inventions which are entitled to a broad range of equivalents;³⁹ 2) marked improvement inventions which are entitled to a substantial range of equivalents;⁴⁰ and, 3) narrow improvement inventions which are entitled to a limited or nonexistent range equivalents.⁴¹

Lundberg, 244 F.2d 543, 548 (C.C.P.A. 1957) (it is language of the claims which must particularly point out and distinctly claim subject matter which applicant considers his invention).

The method of defining an invention prior to 1870 has been described as the central definition system, whereas the method of defining an invention after 1870 has been described as the peripheral definition system. 1. A.W. DELLER, PATENT CLAIMS §§ 5-7 (2d. ed. 1971). The central definition claim is a narrow claim with a typical embodiment to which the courts give broad interpretations, including all equivalent constructions. The claim in *Winans* is an example of a central type claim. See *supra* note 24. A peripheral definition claim marks the metes and bounds of the invention, analogous to a fence around a property. A peripheral type claim contains definitions of the elements or steps. An example of a peripheral type claim is: "A widget comprising a bell, a book, a candle and means for lighting said candle." 4 D. CHISUM, *supra* note 2, § 18.03[5]. Today claims are required to be written as peripheral type claims.

35. *Winans*, 56 U.S. (15 How.) at 347 (Campbell, J., dissenting).

36. *Id.*

37. See generally 4 D. CHISUM, *supra* note 2, § 18.04[2]. See also *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405 (1908) (holding that pioneer inventions are not the only inventions entitled to protection under the Doctrine).

38. 4 D. CHISUM, *supra* note 2, § 18.04[2].

39. The concept of a pioneer invention was first recognized in *Morley Sewing Mach. Co. v. Lancaster*, 129 U.S. 263 (1889). A pioneer invention is one in which the device or function as a whole is new or an invention of such importance as to mark a distinct step in the progress of the art versus an improvement on something already known. Examples of pioneer inventions are the sewing machine, the electrical telegraph, the telephone. *Corning Glass Works v. Anchor Hocking Glass Corp.*, 374 F.2d 473, 477 (3d Cir. 1967) (holding that pioneer patent is entitled to wide breadth of protection).

40. *Price v. Lake Sales Supply R.M., Inc.*, 510 F.2d 388 (10th Cir. 1974) (court held that a marked improvement is entitled to substantial range of equivalents); *Acme Highway Prod. Corp. v. D.S. Brown Co.*, 473 F.2d 849 (6th Cir. 1973) (patent which represents significant improvement over the prior art is entitled to liberal range of equivalents; Acme patent related to seals for highway joints which were substantially improved over the prior art as evidenced by its success); *Phillips Petroleum Co. v. Sid Richardson Carbon & Gasoline Co.*, 416 F.2d 10, 11 (5th Cir. 1969) (patent is entitled to fair range of equivalents).

41. *Bolkcom v. Carborundum Co.*, 523 F.2d 492, 503 (6th Cir. 1975) (where patent represents small but significant advance, the Doctrine is given a narrow range); *McCutchen v. Singer Co.*, 386 F.2d 82, 88 (5th Cir. 1967) ("[a] patentee who has made only a narrow improvement is restricted to his improvement . . ."); *Deitel v. Unique Specialty Corp.*, 54 F.2d 359, 360 (2d.

Additionally, patents on combinations of old elements have been classified as narrow improvement patents.⁴²

The Doctrine has been further refined and held subservient to the doctrine of file wrapper or prosecution history estoppel.⁴³ After the enactment of the Patent Act of 1870, the Supreme Court recognized that both the prior art and the file wrapper must be considered in interpreting the claims of a patent.⁴⁴ If a patent applicant narrows his claims by amendment or cancellation in order to establish patentability, the patent applicant's file wrapper will be modified accordingly. The applicant cannot later "recapture" the claims or parts of the claims that he previously surrendered.⁴⁵ Thus, file wrapper estoppel limits the scope of the Doctrine as applied to a particular device. Yet another refinement is that the Doctrine may be used against the patentee. This occurs when a device falls within the literal words of a claim but accomplishes the same result in a substantially different way. Under these circumstances the Doctrine restricts the claim and defeats the infringement action. This is the reverse doctrine of equivalents.⁴⁶

The Doctrine was created when central type claims, such as the *Winans* claims, were used, but as claims requiring definition through identification of the peripheral aspects of a device became more prevalent, there was doubt as to whether the Doctrine would survive.⁴⁷ The Supreme Court directly

Cir. 1931) ("we can see no ground for resorting to the doctrine of equivalents when the claims speak plainly and the invention is so a trifling step forward.').

42. *Marvin Glass & Assoc. v. Sears, Roebuck & Co.*, 448 F.2d 60 (5th Cir. 1971) (holding that device employing features well known in the art is not allowed broad range of equivalents).

43. See *supra* note 9.

44. *Crawford v. Heysinger*, 123 U.S. 589 (1887) (holding that file wrapper is part of evidence in the case and helps in proper construction of the claims).

45. *Exhibit Supply Co. v. Ace Patents Corp.*, 315 U.S. 126 (1942) (holding that the Doctrine may not be used to recapture claims which patentee has surrendered by amendment).

46. The origin of the reverse doctrine of equivalents is *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537 (1898), where the Court stated:

The patentee may bring the defendant within the letter of his claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted, when he has done nothing in conflict with its spirit and intent.

Id. at 568.

See also *Graver Tank & Mfg. Co., Inc. v. Linde Air Prods. Co.*, 339 U.S. 605 (1950) (where device performs same or similar function as patented device in a substantially different way, but falls within literal words of the claim, the Doctrine may restrict the claim and defeat patentee's action for infringement); 4 D. CHISUM, *supra* note 2, § 18.04[4]; Pigott, *Equivalents in Reverse*, 48 J. PAT. OFF. SOC'Y. 291 (1966).

47. See *supra* note 34. In fact, one commentator had predicted that the Doctrine would not survive the *Graver Tank* decision. Tilton, *The Doctrine of Equivalents in Patent Cases*, 32 J. PAT. OFF. SOC'Y. 861 (1950). The author felt that the Court would have to choose between the Doctrine that the claim measures the grant of the patent and the equitable doctrine of protecting the patentee. Since the Court's tendency had been to limit patent monopolies in view of the antitrust laws, the author felt the Court would do away with the Doctrine. *Id.* at 869.

addressed this question and upheld the Doctrine in *Graver Tank v. Linde Air Prods.*⁴⁸ The patent at issue in *Graver Tank* dealt with fluxes used in electric welding.⁴⁹ The claims described a major element of the flux as any alkaline earth metal silicate.⁵⁰ The plaintiff used magnesium silicate which is an alkaline earth metal silicate, whereas the defendant used manganese silicate which is not an alkaline earth silicate.⁵¹ The Court found that defendant's flux infringed the patentee's flux under the Doctrine.⁵²

In reaching its holding, the Court went through a detailed analysis of the Doctrine and the reasons supporting the Doctrine's continued use. The Court stated that outright duplication "is a dull and very rare type of infringement" and, therefore, the inventor needs more than the literal words to protect his invention.⁵³ In describing the Doctrine, the Court held that equivalence should not be determined by a strict formula nor should it be considered in an absolute vacuum.⁵⁴ According to the Court, the purpose of the Doctrine is to prevent one from practicing a fraud on a patent.⁵⁵

The Court in *Graver Tank* adopted the three-part test set out in *Sanitary Refrigerator Co. v. Winter*.⁵⁶ In *Sanitary Refrigerator*, the Supreme Court stated that infringement under the Doctrine exists when a device: 1) performs substantially the same function; 2) in substantially the same way; 3) to obtain the same result.⁵⁷ If all three parts of the test are satisfied⁵⁸ then the two devices or compositions are the same even though their form may be different.⁵⁹ Applying this test to the patent at issue, the Supreme Court found

48. 339 U.S. 605 (1950).

49. *Id.* at 606.

50. *Id.* A broader set of claims stipulating any "silicates" had been held invalid by the Supreme Court. *Graver Tank & Mfg. Co., Inc. v. Linde Air Prods. Co.*, 336 U.S. 271, 277 (1949), *adhered to by*, 339 U.S. 605 (1950).

51. *Graver Tank*, 339 U.S. at 610.

52. *Id.* at 611-12 (based on evidence in record, Court affirmed trial court's holding that for all practical purposes manganese silicate could be effectually substituted for calcium and magnesium silicates).

53. *Id.* at 607.

54. *Id.* at 609.

55. *Id.* at 608 (to practice fraud on a patent means that infringer would be allowed to steal benefit of an invention).

56. 280 U.S. 30 (1929). The case involved a patent for a latch on a refrigerator. The defendant's latch contained a shortened arm which operated on a lug whereas the patentee's latch had a longer arm which operated on the curved upper surface of the keeper head. The court found that the changes made in the accused device were not enough to avoid infringement. *Id.* at 41.

57. *Id.* at 42.

58. A finding of equivalence is a determination of fact and is to be determined by the trier of fact, and under appellate review should not be changed unless clearly erroneous. *Graver Tank*, 339 U.S. at 609-10.

59. *Id.* at 608 (quoting *Machine Co. v. Murphey*, 97 U.S. (7 Otto) 120, 125 (1878)) ("if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form or shape.").

that manganese was equivalent to magnesium and, thus, there was infringement under the Doctrine.⁶⁰

The dissent in *Graver Tank* adopted the argument of the *Winans* dissent. That is, an applicant is required to particularly point out and distinctly claim his invention.⁶¹ Therefore, what is not specifically claimed is outside the field of the patent.⁶² According to the dissent, the Doctrine circumvents the statutory requirement that the claims define the invention.⁶³ In order to ensure that the public knows what is and what is not within the confines of a patent monopoly, courts should not expand protection beyond the scope of the claims.⁶⁴ If the patentee wants to enlarge the scope of his claims, he should use the reissue procedure.⁶⁵

B. Decisions in the Federal Circuit

After the *Graver Tank* decision, lower courts employed its test to determine infringement under the Doctrine.⁶⁶ The *Graver Tank* test has also been

60. *Graver Tank*, 339 U.S. at 612.

61. 35 U.S.C. § 33 (1946) (current version at 35 U.S.C. § 112 (1982)) (“[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.”).

62. *Graver Tank*, 339 U.S. at 614 (Black, J., dissenting).

63. *Id.*

64. *Id.* at 617 (dissent argued that it was mandate of Congress that a patent’s precise claims mark its monopoly boundaries; granting of patent is exception to competitive enterprise system, therefore, it is important for businessmen to know what information they can freely use).

65. 35 U.S.C. § 64 (1946). The current version, at 35 U.S.C. § 251 (1982), states in relevant part:

Whenever any patent is, through error without any deceptive intention, deemed wholly or partly inoperative or invalid, by reason of a defective specification or drawing, or by reason of the patentee claiming more or less than he had a right to claim in the patent, the Commissioner shall, on the surrender of such patent and the payment of the fee required by law, reissue the patent 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. No new matter shall be introduced into the application for reissue.

No reissued patent shall be granted enlarging the scope of the claims of the original patent unless applied for within two years from the grant of the original patent.

Id.

At the time of *Graver Tank* the courts had interpreted the statute as allowing expansion of a claim, whereas the current version of the statute allows an expansion of the claim only within two years from the grant of the original patent. The dissent also pointed out that broader claims which included manganese silicate were held to be invalid by the same Court.

66. Examples of cases where lower courts have found infringement using the *Graver Tank* test are: *Noll v. O.M. Scott & Sons Co.*, 467 F.2d 295, 300-01 (6th Cir. 1972), *cert. denied*, 411 U.S. 965 (1973) (court found use of dry herbicide in multiple applications infringed patented process of spraying water solution of same herbicide in one application); *Kolene Corp. v. Motor City Metal Treating Inc.*, 440 F.2d 77, 82 (6th Cir.), *cert. denied*, 404 U.S. 886 (1971) (court found defendant’s use of a 46-50% cyanate bath infringed patentee’s claim to bath containing between 25%-40% cyanates). Examples of cases where lower courts have found no infringement

followed by the Court of Appeals for the Federal Circuit.⁶⁷

The Court of Appeals for the Federal Circuit was created in 1982 by merging the Court of Claims and the Court of Customs and Patent Appeals.⁶⁸ The Federal Circuit was created to relieve the workload of the regional courts of appeal, to obtain greater uniformity in the development and application of patent law, and to make more effective use of available federal judicial resources.⁶⁹ The Federal Circuit adopted as binding precedent the holdings of the Court of Claims and the Court of Customs and Patent Appeals ("CCPA").⁷⁰ Since 1982, the Federal Circuit has decided a number of cases dealing with the Doctrine.⁷¹ On some occasions the court has stated that one must look to the invention as a whole,⁷² while on other occasions the court has stated that every element is material and an element-by-element analysis should be employed.⁷³ This has led to an ambiguity in the interpretation of the Doctrine.⁷⁴

The Federal Circuit's first major case regarding the Doctrine was *Hughes Aircraft Co. v. United States*.⁷⁵ The plaintiff claimed that the United States

using the *Graver Tank* test are: *Deyerle v. Wright Mfg. Co.*, 496 F.2d 45, 52 (6th Cir. 1974) (no infringement in defendant's use of pin instead of plaintiff's nail in a device for hip surgery, because there was no evidence that pin would produce same result as the nail); *General Dynamics Corp. v. Whitcomb*, 443 F.2d 630, 633 (4th Cir. 1971), *cert. denied*, 404 U.S. 1016 (1972) (defendant's change in wing design was not a matter of form since form was the "essence" of the invention).

67. *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558 (Fed. Cir. 1986); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351 (Fed. Cir. 1983).

68. Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (1982). A detailed description of the creation of the Federal Circuit may be found in 3 D. CHISUM, *supra* note 2, § 11.066[3][e].

69. 3 D. CHISUM, *supra* note 2, at § 11-106.1 to -106.3. See generally H.R. No. 312, 97th Cong., 1st Sess. (1981). "The new court that results from the merger brought about by this bill will help alleviate the docket pressures on the regional courts of appeals by reallocating and realigning existing judicial resources . . ." *Id.* at 18. "The new Court of Appeals for the Federal Circuit will provide nationwide uniformity in patent law, will make the rules applied in patent litigation more predictable and will eliminate the expensive, time-consuming and unseemly forum-shopping that characterizes litigation in the field." *Id.* at 20.

70. *South Corp. v. United States*, 690 F.2d 1368 (Fed. Cir. 1982). In a footnote, Chief Judge Markey noted that the Federal Circuit had the power, while sitting en banc, to overrule earlier holdings with appropriate explanation. *Id.* at 1370 n.2.

71. See, e.g., *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528 (Fed. Cir. 1987); *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558 (Fed. Cir. 1986); *Lemelson v. United States*, 752 F.2d 1538 (Fed. Cir. 1985); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572 (Fed. Cir. 1984); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351 (Fed. Cir. 1983).

72. *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558 (Fed. Cir. 1986) (applying invention as a whole analysis); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351 (Fed. Cir. 1983) (applying the Doctrine to device as a whole).

73. *Chemical Eng'g Corp. v. Essef Indus., Inc.*, 795 F.2d 1565 (Fed. Cir. 1986); *Lemelson v. United States*, 752 F.2d 1538 (Fed. Cir. 1985).

74. *Harris*, *supra* note 12.

75. 717 F.2d 1351 (Fed. Cir. 1983).

had designed a spacecraft that infringed their patent. The patent in *Hughes* ("Williams patent")⁷⁶ involved a satellite, with the claims employing means-plus-function language.⁷⁷ The *Hughes* court determined that the Williams patent was not a pioneer invention and therefore not entitled to a broad range of equivalents.⁷⁸ Instead, the Williams patent was held to be a major improvement patent which gave it a substantial range of equivalents.⁷⁹

Next, the *Hughes* court looked to the prosecution history, i.e., file wrapper, to determine to what extent the Doctrine should be limited.⁸⁰ Based on the prosecution history, the court determined that the Doctrine should apply.⁸¹ Although the patentee's claims had been amended, the issue of the case was well within the boundaries of the amended claims. The *Hughes* court then found error in the trial court's failure to apply the Doctrine to the invention *as a whole*.⁸² Using the invention as a whole criterion and the *Graver Tank* three-part test, the court found that the United States spacecraft infringed the Williams patent.⁸³

76. *Id.* *Hughes Aircraft Co.* was the assignee of a patent which was granted to Williams (the inventor) and will be referred to herein as the Williams patent.

77. *Id.* at 1357. Means-plus-function claims are allowed and defined by 35 U.S.C. § 112 (1952), which states in relevant part:

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.

Id.

Thus, a means-plus-function clause does not contain details of the apparatus capable of carrying out the function. Examples of means-plus-function language are: "input means including a keyboard for entering digits . . . electronic means responsive to said signals for performing arithmetic calculations . . . memory means for storing digits . . . arithmetic means coupled to said memory means. . . means for selectively transferring numbers . . . means for providing a visual display . . ." *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1561 (Fed. Cir. 1986). At one time means-plus-function claims were not allowed. *Halliburton Oil Well Cementation Co. v. Walker*, 329 U.S. 1 (1946).

78. *Hughes Aircraft*, 717 F.2d at 1362. The court stated that it was an earlier patent by McLean which disclosed the basic concept in which a pulsed jet is used to precess the spin axis of a spin-stabilized body. The Williams patent provided a major improvement on the basic concept.

79. *Id.*

80. *Id.*

81. *Id.* at 1363. The claims amended by the patentee still contained control of the satellite by a ground crew. The method of control by a ground crew was the issue in the case.

82. *Id.* at 1364. ("[t]he failure to apply the doctrine of equivalents to the claimed invention *as a whole*, and the accompanying demand for 'obvious and exact' equivalents of two elements the presence of which would have effectively produced literal infringement, was error.") (emphasis added).

83. *Id.* at 1366. The accused spacecraft and the Williams spacecraft differed in that: 1) the accused spacecraft stores the ISA position in a computer whereas the Williams spacecraft transmits the information to a ground crew; and, 2) the accused spacecraft receives and stores jet firing information whereas the Williams spacecraft receives and immediately executes the firing signals. The court found that substitution of an on-board computer to store and calculate information instead of the ground crew performing such a function was not enough to avoid infringement. *Id.*

The Federal Circuit again used the invention as a whole analysis in *Texas Instruments, Inc. v. United States Int'l Trade Comm'n.*⁸⁴ Texas Instruments brought suit against twenty one foreign calculator manufacturers for unfair trade practices alleging infringement of several claims of its patent on an electronic calculator.⁸⁵ The claims of the Texas Instrument patent were described in means-plus-function language. After going through the clauses of the claims, the *Texas Instrument* court found that every function in the Texas Instrument patent was performed by the accused calculators.⁸⁶ The court determined that in a combination invention, such as this, a proper analysis involved looking at the invention as a whole.⁸⁷ The court looked to the invention as a whole, and held that the accumulated differences in the accused devices were beyond the fair range of equivalents that should be allotted the Texas Instruments patent and, therefore, there was no infringement under the Doctrine.⁸⁸

In contrast to *Hughes* and *Texas Instruments*, the Federal Circuit has also used an element-by-element analysis in determining infringement under the Doctrine. This trend began with *Lemelson v. United States.*⁸⁹ In its analysis of the Doctrine, the *Lemelson* court stated that every element of a claim is essential and material and, thus, in order to show infringement every element or its equivalent must be present in the accused device.⁹⁰ Because one element was missing from the accused device, the *Lemelson* court found no infringement.⁹¹

84. 805 F.2d 1558 (Fed. Cir. 1986).

85. *Id.* at 1560.

86. *Id.* at 1568. The functions performed by the patented and accused calculators were: a) input means by "one set of decimal number keys," b) electronic means by an "integrated semiconductor circuit array," and, c) display means. *Id.*

87. *Id.* at 1569 (court stated that Texas Instrument patent represented pioneer invention and was entitled to broad equivalents).

88. *Id.* at 1570. The court found the following differences between means specified by the Texas Instrument patent and the accused calculators: 1) conductive strip input means versus scanning matrix encoder; 2) bipolar semiconductor electronic means versus metal oxide semiconductors with integrated circuits; and, 3) thermal printer versus liquid crystal display. However, a broad reading of the claims meant that each means would fall within the scope of each clause of the claim. The court went on to state that the proper analysis involves looking at the invention as a whole and when all the changes were looked at in terms of the whole calculator, the court found no infringement. See also *Moeller v. Ionetics, Inc.*, 794 F.2d 653, 656-57 (Fed. Cir. 1986) (court looked to device and invention as a whole to determine infringement); *Caterpillar Tractor Co. v. Berco*, 714 F.2d 1110, 1115 n.2 (Fed Cir. 1983) ("[a]n infringer appropriates an invention not words").

89. 752 F.2d 1538 (Fed. Cir. 1985). See also *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1582 (Fed. Cir. 1984) (accused system lacked element of the patent claims and therefore did not infringe).

90. *Lemelson v. United States*, 752 F.2d 1538, 1551 (invention in *Lemelson* was a device for measuring distance between two surfaces of a workpiece).

91. *Id.* (patented device contained a manipulation means whereas accused device did not).

This element-by-element approach was adopted in *Chemical Eng'g Corp. v. Essef Indus. Inc.*⁹² Looking to the prosecution history, the court noted that raising the pH in the plaintiff's water treatment system in the specific manner claimed was crucial to patentability.⁹³ Since the accused device did not raise the pH in the manner claimed, the *Chemical Eng'g* court found no infringement under the Doctrine.⁹⁴

The most recent case to apply the element-by-element approach was *Perkin Elmer Corp. v. Westinghouse Elec. Corp.*⁹⁵ The invention in the Perkin Elmer patent related to an electrodeless discharge lamp, with the issue being whether tap coupling, the claimed invention, was the same as loop coupling, the accused device.⁹⁶ The *Perkin Elmer* court first stated that the Doctrine cannot be used to erase structural and functional language in a claim.⁹⁷ The court distinguished the case at bar from *Hughes*, stating that the *Hughes* statement regarding the invention as a whole referred to infringement of an entire claim. In contrast, the case at bar dealt with a means-plus-function limitation, or merely one element of a claim.⁹⁸ Applying the *Lemelson* concept that each element of a claim is material and essential, the *Perkin Elmer* court found that the loop coupling did not function in the same way as the claimed tap coupling and, accordingly, there was no infringement.⁹⁹

It is clear that the Federal Circuit, while employing the *Graver Tank* test for infringement under the Doctrine, has applied the test in two distinct ways. On some occasions the court has stated that one must look to the invention as a whole,¹⁰⁰ while on other occasions the court has stated that

92. 795 F.2d 1565 (Fed. Cir. 1986) (case involved patent for water treatment of domestic water supplies).

93. *Id.* at 1572-73. The patent at issue related to a method for removing iron from well water. The patented process, as amended, required "gradually raising the pH of the water to 7.0-7.5 while filtering . . . directly through a mineral bed comprised of a mineral capable of raising the pH to 7.0-7.5." *Id.* at 1572 n.7. The accused device did not raise the pH and therefore, the court found no infringement under the Doctrine. *Id.* at 1572.

94. *Id.*

95. 822 F.2d 1528 (Fed. Cir. 1987).

96. *Id.* at 1531. Tap coupling and loop coupling refers to a resonator transformer for an electrodeless discharge lamp (EDL). The tap coupler is an autotransformer-type coupler with a tap point variably located on the helical coil for connecting it to the r-f power source. The loop coupler is a transformer-type (not autotransformer) coupler in which the connecting point between the helical coil and the r-f power source is not fixed for purposes of frequency tuning or impedance matching. However, as the dissent pointed out "[b]oth transformers perform the same function (electrical power transfer), in the same way (electromagnetic induction), with the same result (excitation of the resonator)." *Id.* at 1541.

97. *Id.* at 1532. That is, the public is entitled to notice regarding the bounds of the monopoly.

98. *Id.* at 1532-33. The *Hughes* statement should not mean that claim limitations should be treated as insignificant or immaterial in determining infringement.

99. *Id.* at 1535. A lengthy dissent was filed by Circuit Judge Newman in which she accused the majority of rewriting precedent, namely *Hughes*, and not looking to the invention as a whole. Using the invention as a whole analysis, Judge Newman would have found infringement because the accused device performed the same function in the same way to obtain substantially the same result. *Id.* at 1535-44.

100. See *supra* note 72 and accompanying text.

every element is material and an element-by-element analysis should be used.¹⁰¹

II. THE *Pennwalt Corp. v. Durand-Wayland, Inc.* DECISION

In *Pennwalt Corp. v. Durand-Wayland, Inc.*,¹⁰² the Federal Circuit considered en banc the application of the Doctrine. The court looked to its own precedents as well as Supreme Court precedents to determine that an element-by-element analysis should be used to decide infringement under the Doctrine.¹⁰³ Using this analysis, the majority found no infringement.¹⁰⁴

A. *Factual and Procedural History*

Pennwalt sued Durand-Wayland for infringing Claims 1, 2, 10 and 18 ("claims-at-issue") of its United States Patent number 4,106,628 ("'628 patent").¹⁰⁵ In its amended answer, Durand-Wayland attacked the validity of the '628 patent, denied infringement and alleged several counterclaims.¹⁰⁶ The patent in question related to a sorter of fruits and other items.¹⁰⁷ The sorter was a machine that was able to electronically determine the weight and color of the items and sort them into one of several combined weight and color categories. Durand-Wayland manufactured and sold two types of sorting machines which used software to do the sorting. One machine sorted items by weight while the second machine sorted by weight and color.¹⁰⁸

The trial court issued an opinion which concluded: 1) the '628 patent was valid; and, 2) the accused devices did not infringe any of the claims-at-issue, either literally or under the Doctrine.¹⁰⁹ Both parties appealed.

101. See *supra* note 73 and accompanying text.

102. 833 F.2d 931 (Fed. Cir. 1987), *cert. denied*, 108 S. Ct. 1226, *cert. denied*, 108 S. Ct. 1474 (1988).

103. *Id.* at 935.

104. *Id.* at 939.

105. *Id.* at 932. Claims 1 and 2 relate to a sorter which conveys items along a track having an electronic-weighing device that produces an electrical signal proportional to the weight of the item. *Id.* at 933. Additionally, the sorter has a signal comparison means, clock means, position indicating means and discharge means. The sorter of claims 10 and 18 combines a weighing device and an optical scanner. The signals from the weighing device and color sensor are combined and an appropriate signal is sent at the proper time to discharge the item into the container corresponding to its color and weight. *Id.* Each step of claims 10 and 18 is performed by discrete electrical components which are hard wired into a network, the details of which were presented in the specification. *Id.*

106. *Pennwalt Corp. v. Durand-Wayland, Inc.*, 225 U.S.P.Q. (BNA) 558 (N.D. Ga 1984) (parties agreed that patent validity and infringement issues should be tried first).

107. *Pennwalt*, 833 F.2d at 933.

108. *Id.*

109. First, the district court found that all the elements of the Pennwalt patent were not present in the Durand device and thus there was no literal infringement. Second, the district court found that the microprocessor and software of Durand were not functional equivalents of the hard-wired components of Pennwalt. *Pennwalt*, 225 U.S.P.Q.(BNA) at 572.

*B. Majority Opinion of the Circuit Court of Appeals
for the Federal Circuit*

Although the case was argued before a panel of the Federal Circuit, the case was decided en banc.¹¹⁰ The *Pennwalt* court first looked at whether the Durand-Wayland sorter literally infringed the Pennwalt sorter.¹¹¹ Since the Pennwalt claims were written in means-plus-function language, the court looked to the specification to discern the structure described therein.¹¹² Comparing the structure in the specification to the Durand structure, the appellate court affirmed the district court's finding of no literal infringement.¹¹³

Having found no literal infringement, the court looked at whether there was infringement under the Doctrine. The *Pennwalt* court began its Doctrine analysis by stating the test set forth in *Graver Tank*.¹¹⁴ The court determined that in order to find infringement, every element of a claim or its substantial equivalent must be present in the accused device.¹¹⁵ Under this analysis, the district court found that the position indicating functions were missing from the accused device while other functions were performed in a substantially different way.¹¹⁶ The Federal Circuit approved of the district court's element-by-element analysis for infringement under the Doctrine and used the same analysis to determine whether the district court was clearly erroneous.¹¹⁷

The *Pennwalt* court first looked to the prosecution history, or file wrapper, to determine the appropriate range of equivalents applicable to the Pennwalt patent.¹¹⁸ Based on the file wrapper, the *Pennwalt* court upheld the district court's finding that the invention in-suit was not a pioneer invention, but an improvement in a crowded art.¹¹⁹ The *Pennwalt* court also observed that during prosecution a position indicating means element was added, and that

110. *Pennwalt*, 833 F.2d at 932. An en banc consideration is an extraordinary procedure one purpose of which is to bring to the entire court a precedent setting question of exceptional importance. See FED. R. APP. P. 35.

111. *Pennwalt*, 833 F.2d at 933.

112. *Id.* at 934 (this analysis was carried out to determine if there was literal infringement).

113. *Id.* (fact that accused device did not have a position indicating means which patented device contained negated possibility of finding literal infringement).

114. The specific language used by the Court is that an accused device must perform "substantially the same overall function or work, in substantially the same way, to obtain substantially the same overall result as the claimed invention." *Id.*

115. *Id.* at 935 ("It is . . . 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.") (quoting *Lemelson v. United States*, 752 F.2d 1538, 1551 (Fed. Cir. 1985)).

116. 833 F.2d at 935.

117. *Id.* at 935-37.

118. *Id.* at 937 (court noted that claims had been properly narrowed during prosecution to assure that claims would not read on the prior art).

119. *Id.* (because invention was carefully described so that it did not read on the prior art, invention was classified as an improvement invention).

this element was crucial to patentability.¹²⁰ The trial court found and the appellate court affirmed that the Durand sorters did not contain a first or second position indicating means.¹²¹ Further, the *Pennwalt* majority found that the software used in the Durand sorters was not equivalent to the hard-wired circuitry of *Pennwalt*.¹²² Because no component in the Durand sorters performed an equivalent function to the function of the first position indicating means component, the majority held there was no infringement under the Doctrine.¹²³

C. Dissenting Opinion

The dissent agreed with the majority that there was no literal infringement.¹²⁴ However, the dissent strongly argued that the majority's interpretation of the Doctrine was contrary to the precedent of the Federal Circuit and the Supreme Court.¹²⁵ The dissent argued that although the majority "facially" retained the *Graver Tank* test, it had "eviscerated" the test's underlying rationale.¹²⁶ Further, the dissent stated that the majority ignored precedent which dictates that the proper analysis under the Doctrine is to examine the invention as a whole.¹²⁷

In support of its contention that the majority had departed from recent precedent, the dissent first looked to *Hughes Aircraft*.¹²⁸ The *Hughes* court held that the Doctrine must be applied to the invention as a whole.¹²⁹ According to the dissent, had the *Hughes* court applied an element-by-element analysis, they would have found no infringement.¹³⁰ Further, the dissent felt that the majority's current analysis was no more than a search

120. *Id.* (prior art disclosed storing information with respect to sorting criteria, but did not continuously track location of objects; after the words "continuously indicating" were added, claim was allowed).

121. 833 F.2d at 937.

122. *Id.* at 938. Examples of hard-wired components are shift registers, comparators, shaft encoders and gates. The Durand-Wayland device uses a computer and software to do the sorting. *Pennwalt*, 225 U.S.P.Q.(BNA) at 559-60.

123. *Pennwalt*, 833 F.2d at 939.

124. *Id.* (Bennett, J., dissenting).

125. *Id.*

126. *Id.* at 940 ("in practical effect, the majority has eviscerated the underlying rationale of *Graver Tank* by requiring, under the doctrine of equivalents, an exact equivalent for each element of the claimed invention.").

127. *Id.* (citing *Martin v. Barber*, 755 F.2d 1564, 1568 (Fed. Cir. 1985); *Carmen Indus., Inc. v. Wahl*, 724 F.2d 932, 942 (Fed. Cir. 1983); *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1364 (Fed. Cir. 1983)).

128. 833 F.2d at 941.

129. *Id.*

130. *Id.* at 942. The *Hughes* space satellite received and sent out signals in order to adjust the position of the satellite. In contrast, the accused spacecraft performed those functions by using an onboard computer. This is analogous to replacement of the hard-wired circuitry by a computer in the case at bar. *Id.*

for "obvious and exact equivalents" which was denounced in *Hughes* as a proxy for a finding of literal infringement.

Next, the dissent criticized the majority's narrow view of the interchangeability of the elements of the accused device and those of the claimed device and explored the question of whether a microprocessor and its accompanying software were an equivalent substitution for hard-wired circuitry.¹³¹ The dissent pointed out that the trial court's finding that the microprocessor did not perform each of the functions of the hard-wired circuitry was part of the district court's literal infringement analysis and was inappropriately applied by the majority to the Doctrine analysis.¹³² The dissent noted that this finding reflected nothing more than the inherent differences between microprocessors and hard-wired circuitry and should not preclude a finding of infringement under the Doctrine.¹³³ However, the majority had blurred the concept of literal infringement under 35 U.S.C. section 112, paragraph 6, and the Doctrine's infringement analysis. The dissent contended that the proper analysis should focus on whether "the changes or substitutions made alter substantially the way that the accused device works when compared to the claimed invention."¹³⁴

The dissent claimed that the majority erred in interpreting the meaning of the term "position indicating means" and stated that the accused device and the claimed invention indicate position in equivalent manners.¹³⁵ According to the dissent, both devices continually store weight and color data of an item until it is discharged. The claimed invention does this by using shift registers while the accused device does it by a queue and pointers which move with the conveyor cups.¹³⁶ Thus, even though Pennwalt restricted its claims during prosecution, those limitations are irrelevant since the accused device performs a continuous position indicating means.¹³⁷

The dissent also felt the majority had incorrectly evaluated Pennwalt's assertion that the Pennwalt sorter compares the color of an item before the item goes to the weight scale, whereas the Durand sorter does the comparison

131. *Id.* at 942.

132. *Id.* at 942-43 (dissent noted that quote of district court cited by majority regarding an element-by-element analysis was actually part of district court's literal infringement analysis).

133. 833 F.2d at 942.

134. *Id.* at 948. In a related inquiry, the dissent noted that an exploration into whether one "reasonably skilled in the art" would have known of the interchangeability of the hard-wired circuitry and the microprocessor was appropriate. *Id.* at 942. The dissent, however, chastised the district court for focusing on whether one reasonably skilled in the art would know *how* to substitute one mechanism for the other. *Id.* The dissent argued that the narrow focus of the district court inquiry was inappropriate because, under a doctrine of equivalents analysis, a sufficient degree of flexibility was necessary in order to reach a just result and impose a requirement that the alleged infringer know *how* to substitute interchangeable components restricted this necessary flexibility. *Id.* at 942 n.5.

135. *Id.* at 944.

136. *Id.*

137. *Id.*

after the weight scale. According to Pennwalt, this is merely a change in the position of an element of the sorter which is insufficient to avoid infringement. The majority had stated that Pennwalt's assertion was significantly flawed because the claimed invention required the position indicating means to be responsive to a specified signal and the accused device did not have such a specified signal.¹³⁸ According to the dissent, the majority's view reflected nothing more than a literal infringement analysis. By looking at the devices as a whole, however, the dissent found equivalent functions and, therefore, infringement under the Doctrine.

Finally, the dissent addressed the fact that the majority, in its *Pennwalt* opinion, adopted the position of the dissenting opinion in *Graver Tank*.¹³⁹ The *Pennwalt* dissent stated that the Doctrine represents a choice between two conflicting policies. The two policies are: 1) giving notice to the public of the metes and bounds of a patent; and, 2) giving the patentee complete and fair protection of his invention. The device as a whole test reflects a preference for the latter policy. The dissent noted that the tension between the two policies and the inability to fully reconcile the two views had long been recognized and accepted by the courts.¹⁴⁰ Pointing to *Graver Tank*, the dissent argued that the majority's decision to focus on the policy choice of notice to the public was shortsighted.¹⁴¹ Elaborating on this, the dissent went on to say that the majority's holding essentially says that "unimportant and insubstantial" changes are enough to show that an accused device does not function in substantially the same way and, therefore, does not infringe under the Doctrine.¹⁴²

In conclusion, the dissent asserted that the proper inquiry was to consider the device as a whole when applying the *Graver Tank* test. Because the district court had not properly addressed the question of which inquiry was appropriate, the dissent wanted to remand the case to the district court for a proper determination of infringement under the doctrine of equivalents.¹⁴³

D. Additional Views by Circuit Judge Nies

Circuit Judge Nies submitted additional views in support of the majority position. The objective of her "Additional Views" was to review precedents

138. *Id.*

139. 833 F.2d at 945.

140. *Id.* at 945-46. See *Royal Typewriter Co. v. Remington Rand Inc.*, 168 F.2d 691, 692 (2d Cir. 1948), where Judge Learned Hand stated:

[o]n proper occasions courts make . . . [claims] cover more than their meaning will bear. If they applied the law with inexorable rigidity, they would never do this [But] at times they resort to the 'doctrine of equivalents' to temper unsparing logic and prevent an infringer from stealing the benefit of the invention. No doubt, this is strictly speaking an anomaly; but it is one which courts have frankly faced and accepted almost from the beginning.

Id. at 692.

141. *Pennwalt*, 833 F.2d at 946-47.

142. *Id.* at 947 (arguing that under majority's analysis, change in form is enough to avoid infringement).

143. *Id.* at 948-49.

on the Doctrine and demonstrate that the majority's opinion did not overrule any of these precedents. Judge Nies began her analysis by reviewing the current statutes setting forth the requirements of claims.¹⁴⁴ Judge Nies then presented a long list of cases which held that all elements of a combination claim are essential and material and that omission of one of these elements avoids infringement.¹⁴⁵ Finally, she argued that the principle that an infringing device must contain every element of a claimed device was not discarded by *Graver Tank*.¹⁴⁶

Judge Nies contended that the element-by-element analysis applied by the majority was consistent with *Graver Tank*.¹⁴⁷ According to Judge Nies, one must read *Hughes* in light of the "given" principle that in order for there to be infringement, every element of a claim must be present in the accused device.¹⁴⁸ She argued that *Hughes* did not depart from the "all elements rule," i.e., every element of a claim must be present in the accused device.¹⁴⁹ Judge Nies stated that the *Hughes* court analyzed each element of the claim and found equivalent functions of the elements, thereby satisfying the "all elements rule."¹⁵⁰ Thus, the majority applied an element-by-element analysis.¹⁵¹

Judge Nies indicated that she believed that reading *Hughes* as support for an analysis which fails to examine the individual elements of a claim was inaccurate. According to Judge Nies, part of the misreading of *Hughes* has been due to the confusion in the two step "double function" inquiry.¹⁵²

144. *Id.* at 949 (Nies, J., additional views) (35 U.S.C. § 112 requires that inventor particularly point out and distinctly claim subject matter of his invention).

145. *Id.* at 949-52. *See, e.g.*, *Lemelson v. United States*, 752 F.2d 1538, 1551 (Fed. Cir. 1985) ("in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent"); *Autogiro Co. v. United States*, 384 F.2d 391, 403 (Ct. Cl. 1967) ("it is necessary that every element or its substantial equivalent be found in the accused structures"); *Water-Meter Co. v. Desper*, 101 U.S. (11 Otto) 332, 335-37 (1879) ("[t]he claim of a combination is not infringed if any of the material parts of the combination are omitted"); *Prouty v. Ruggles*, 41 U.S. (16 Pet.) 336, 341 (1842) (omission of a part of combination patent avoids infringement).

146. *Pennwalt*, 833 F.2d at 952. Judge Nies noted that only when the *Graver Tank* Court determined that manganese was equivalent to magnesium did the court find infringement. Judge Nies concluded that the equivalents in the doctrine of equivalents refers to equivalents of the elements. *Id.*

147. *Id.* at 953. *See Hughes Aircraft v. United States*, 717 F.2d 1351, 1364 (Fed. Cir. 1983) ("[t]he failure to apply the doctrine of equivalents to the claimed invention as a whole, and the accompanying demand for 'obvious and exact' equivalents of two elements which would effectively produce literal infringement, was error.').

148. *Pennwalt*, 833 F.2d at 953.

149. *Id.* *See* 4 D. CHISUM, *supra* note 2, § 18.03[4], setting forth the All Elements Rule, "It follows that a claim will not cover or 'read on' any device or process unless that device or process contains all the elements of the claims (or an equivalent thereof within the meaning of the doctrine of equivalents)."

150. *Pennwalt*, 833 F.2d at 953. *See supra* note 77 for the language of 35 U.S.C. § 112.

151. 833 F.2d at 953.

152. *Id.* at 954 n.3.

That inquiry looks to: 1) how the device functions or works; and, 2) the function in a means-plus-function element.¹⁵³ The first step of the inquiry looks to whether the accused device and the claimed device function in the same way, whereas the second step of the inquiry focuses on the function of the individual elements.¹⁵⁴ The *Hughes* court found that the device performed an equivalent function and that the elements at issue, while not literally equivalent, were functionally equivalent.¹⁵⁵ Judge Nies argued that by requiring equivalency in each element, *Hughes* was consistent with case law.¹⁵⁶ However, by failing to recognize the fact that the *Hughes* court looked to both the invention as a whole and the elements individually, other courts had misread *Hughes*.¹⁵⁷

Judge Nies concluded her analysis by looking to the requirements the statutes place on a patent applicant.¹⁵⁸ The statutes require specificity in the claims so that the public has notice of what constitutes a patentee's rights. Therefore, she felt that courts should not broaden claims because that would be a violation of due process and contrary to the statutes.¹⁵⁹

E. Commentary By Circuit Judge Newman

Judge Newman submitted a lengthy commentary in which she stated that the majority opinion contradicted precedents and represented a retrenchment of the court's equitable authority.¹⁶⁰ Judge Newman reviewed the issue on appeal and then presented a thorough review of the Doctrine. Judge Newman began her commentary by examining the process by which claims evolved and early courts determined infringement.¹⁶¹ Judge Newman then traced: 1) how the Supreme Court had applied the Doctrine to the invention as a whole and to parts thereof;¹⁶² 2) how the range of equivalents allowed an invention depends on the degree of the invention;¹⁶³ 3) why some elements of an

153. *Id.*

154. *Id.*

155. *Id.* at 953.

156. *Id.*

157. *Id.* at 954 n.3.

158. *Id.* at 954 (patent applicants must particularly point out and distinctly claim subject matters which they regard as their inventions).

159. *Id.*

160. *Id.* at 954-75 (Newman, J., commentary).

161. *Id.* at 957-59.

162. *Id.* at 959-63. Judge Newman used cases such as: *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30 (1929); *Burr v. Duryee*, 68 U.S. (1 Wall) 531 (1864); *McCormick v. Talcott*, 61 U.S. (20 How.) 402 (1858); and *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853), to support her position that courts have looked to the invention as a whole in determining infringement under the Doctrine. *Id.*

163. *Pennwalt*, 833 F.2d at 963-64. Pioneer inventions are entitled to a broad range of equivalents, marked improvement inventions are entitled to a substantial range of equivalents and narrow improvement inventions are entitled to limited or no range of equivalents. See *supra* notes 39-42 and accompanying text.

invention may be more important than others;¹⁶⁴ and, 4) how the Doctrine applies to the case of a combination of old elements.¹⁶⁵ Judge Newman also presented cases which held that omission of an element did not avoid infringement.¹⁶⁶

Next, Judge Newman reviewed decisions in the Federal Circuit and policy considerations¹⁶⁷ favoring the Doctrine. In conclusion, Judge Newman stated that all precedent pointed to the application of the Doctrine to the invention as a whole and that the Doctrine should not be governed by a strict formula.¹⁶⁸

III. ANALYSIS

This section will show that the *Pennwalt* decision significantly changed the test for infringement under the Doctrine. The element-by-element test adopted by the *Pennwalt* court effectively overruled *Graver Tank*. Although the element-by-element test used by the majority is very easy to apply, it does not provide the equitable protection for which the Doctrine was intended.¹⁶⁹ The majority's test under the Doctrine is virtually indistinguishable from literal infringement as defined by 35 U.S.C. section 112, paragraph 6.¹⁷⁰

164. *Pennwalt*, 833 F.2d at 964-65 (changes in immaterial features would not avoid infringement).

165. *Id.* at 965-67 (since early patents only enumerated essential elements in the claims, removal of one of the elements of a combination avoided infringement).

166. *Id.* at 967-69. *See, e.g.*, *United States v. Harvey Steel Co.*, 227 U.S. 165 (1913) (infringement not avoided by omitting sand backing that was element of claim); *Royer v. Schultz Belting Co.*, 135 U.S. 319 (1890) (whether omission of pins or rollers avoids infringement is question of fact for jury).

167. *Pennwalt*, 833 F.2d at 970-74.

168. *Id.* at 974.

169. *See* Nieman, *The Federal Circuit Resolves Ambiguities in the Doctrine of Equivalents*, 70 J. PAT. OFF. SOC'Y 153 (1988). The author suggests a framework based on the reasoning in *Pennwalt*. The framework involves a three-part test, the first two parts of which look to whether the accused device achieves substantially the same result and performs substantially the same function as the claimed invention. The third part is stated as follows:

Determine whether the accused device operates in substantially the same way as the claimed invention. In so doing, compare each element of the claim with the accused device to determine whether the accused device contains each element or its substantial equivalent. A substantial equivalent is one that causes the accused device to operate in substantially the same way as the claimed invention, considering the nature, purpose and quality of the element and its corresponding structure in the accused device.

Id. at 159 (footnotes omitted).

170. An analysis under § 112 involves finding an equivalent structure as well as identity of claimed function for that structure. *Pennwalt*, 833 F.2d at 934 (citing *Palumbo v. Don-Joy Co.*, 762 F.2d 969 (Fed. Cir. 1985); *D.M.I., Inc., v. Deere & Co.*, 755 F.2d 1570 (Fed. Cir. 1985); *Radio Steele & Mfg. Co., v. MTD Prods., Inc.*, 731 F.2d 840 (Fed. Cir. 1984)). The Doctrine analysis looks to whether the accused device performs substantially the same function. *Pennwalt*, 833 F.2d at 935.

The premise on which the majority based its analysis is that each element of a claim is material and essential.¹⁷¹ This is certainly true and is substantiated by a long line of cases.¹⁷² As Judge Newman pointed out in her commentary, however, there are exceptions to the rule.¹⁷³ The cases cited by Judge Newman essentially state that if the element omitted is immaterial, infringement may still be found. By immaterial, the courts mean that the invention as a whole is not affected by elimination of the element.¹⁷⁴ Therefore, despite the general rule that an accused device must contain all the elements of a claim, infringement may be found when an element is omitted from an accused device.¹⁷⁵

Furthermore, it is unclear whether, when the majority says 'element,' they in fact mean 'limitation.' The majority interchanges 'element' and 'limitation' throughout its entire opinion.¹⁷⁶ As the court stated in *Perkin-Elmer*: "[r]eferences to 'elements' can be misleading."¹⁷⁷ The word 'element' has been used to refer to both a component of a device and a limitation of a claim.¹⁷⁸ It is the limitation of a claim which is used to determine infringement. Therefore, if by 'element' the *Pennwalt* majority meant 'limitation,' then certainly in order to find infringement under the Doctrine the accused device must contain all the 'limitations' found in the claim.

However, a proper Doctrine analysis does more than determine if there is a one-to-one correspondence between the elements of a patented device and those of an accused device. Under the Doctrine, a determination of infringement looks to whether the function of an element in a patented device is present in an accused device. This has necessitated that courts look to whether the accused device and the patented device "as a whole" perform the same function in substantially the same way to obtain the same result. For example, the *Hughes* court held that a proper Doctrine analysis requires the reviewing

171. *Pennwalt*, 833 F.2d at 935.

172. See, e.g., *Interdent Corp. v. United States*, 531 F.2d 547, 552 (Ct. Cl. 1976); *Autogiro Co. of America v. United States*, 384 F.2d 391, 403 (Ct. Cl. 1967) and references therein.

173. *Pennwalt*, 833 F.2d at 967-68.

174. *AMI Indus., Inc. v. EA Indus., Inc.*, 204 U.S.P.Q. 568, 590 (W.D.N.C. 1979) ("[i]mmaterial variations in an accused infringing device will not avoid infringement."); *Berkey Photo, Inc. v. Klimsch-Repro, Inc.*, 388 F. Supp. 586, 594 (S.D.N.Y. 1975) ("[m]oreover, no single element or group of elements can be deemed to represent the 'heart' or 'gist' of the invention, so that infringement may be found despite the omission of other, insignificant elements from the accused device.") (citing *Aro Mfg. Co. v. Convertible Top Co.*, 365 U.S. 336 (1961)).

175. *American Stainless Steel Co. v. Ludlum Steel Co.*, 290 F. 103, 109 (2d Cir. 1923) ("omitting silicon, defendant has produced stainless steel; with the silicon added, it has also produced stainless steel; therefore in respect of infringement, the silicon is immaterial"); *United States v. Harvey Steel Co.*, 227 U.S. 165 (1913) (infringement of claimed invention not avoided by omitting sand backing element).

176. *Pennwalt*, 833 F.2d at 937.

177. *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1533 n.9 (Fed. Cir. 1987).

178. *Id.*

court to look at the invention as a whole.¹⁷⁹ Again in *Martin v. Barber*,¹⁸⁰ the Federal Circuit stated that the fact finder must determine if the components viewed as a whole operate in substantially the same way, and have substantially the same function and achieve substantially the same result as the claimed invention.¹⁸¹ Although the invention as a whole phrase was not used by the Supreme Court in *Graver Tank*, it is implicit in the phraseology the Court used. The *Graver Tank* Court stated that equivalence does not require complete identity for every purpose and in every respect.¹⁸² The *Graver Tank* Court referred to the flux and accused composition as being substantially equivalent in operation.¹⁸³

Furthermore, the cases relied on by the majority as the basis of its element-by-element analysis contain language which indicates that one should look to the operation of a device as a whole.¹⁸⁴ For example, in *Perkin-Elmer*, the court found the differences in the devices such that the devices as a whole did not operate in substantially the same way.¹⁸⁵ In *Lemelson*, the "manipulation means" was found to be absent from the accused device and, therefore, there was no infringement.¹⁸⁶ *Lemelson* and the other cases cited by Judge Nies in her additional views are all based on the omission of an element which resulted in the accused device not working in substantially the same way as the patented device.¹⁸⁷

In *Pennwalt*, the majority looked to the file wrapper and noted that the addition of a position indicating means was crucial to patentability.¹⁸⁸ The majority then stated that if such a limitation were absent from a device, that device would not operate in substantially the same way as the claimed invention.¹⁸⁹ The majority did not find a position indicating means but stopped short of looking for equivalent functions in the accused device because it determined that any combination of components would not be responsive to the specified signal in the *Pennwalt* patent.¹⁹⁰ As the dissent stated, this type of analysis is nothing more than a test for literal infringement.¹⁹¹

179. See *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1364 (Fed. Cir. 1983).

180. 755 F.2d 1564 (Fed. Cir. 1985).

181. *Id.*

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

183. *Id.* at 610-11. The Court stated 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." *Id.* at 609.

184. *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528 (Fed. Cir. 1987); *Chemical Eng'g Corp. v. Essef Indus., Inc.*, 795 F.2d 1565 (Fed. Cir. 1986); *Lemelson v. United States*, 752 F.2d 1538 (Fed. Cir. 1985); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572 (Fed. Cir. 1984).

185. *Perkin-Elmer*, 822 F.2d at 1530 n.5.

186. *Lemelson*, 752 F.2d at 155.

187. *Pennwalt*, 833 F.2d at 973.

188. *Id.* at 937.

189. *Id.*

190. *Id.* at 938.

191. *Id.* at 945 (Bennett, J., dissenting in part).

Assuming that the trial court correctly determined that the Durand device did not contain a position indicating means or a substantial equivalent, then the Federal Circuit Court should have clearly stated that file wrapper estoppel required a finding that there was no infringement.¹⁹² It was not necessary for the majority to set up a narrow and restrictive test for determining infringement under the Doctrine.

Contrary to the admonitions of the Supreme Court in *Graver Tank*, the majority's test makes the Doctrine a prisoner of a formula which is virtually identical to literal infringement. Until *Pennwalt*, literal infringement and the Doctrine have been separate and usually anomalous concepts. Literal infringement is determined by the exact words of the claims which define the invention, and courts may only interpret the claims and not rewrite them.¹⁹³ This definition of infringement gives clear notice to the public as to what the metes and bounds of the patent monopoly are and allows the public to "engineer" around the monopoly. However, under the Doctrine, literal overlap is not required. To find infringement, the structures must do the same work in substantially the same way and accomplish the same result. Thus, the Doctrine provides a greater scope of protection to the patent owner.¹⁹⁴

The Doctrine was created for those situations in which an infringer copies the substance of an invention without copying all or part of its form. As Judge Durfee stated in *Autogiro Co. of Am. v. United States*: "[t]he doctrine of equivalents casts around a claim a penumbra which also must be avoided if there is to be no infringement."¹⁹⁵ The Doctrine allows a patentee to obtain the complete rights to his invention which he may not obtain by a literal reading of his claims. In this sense the Doctrine is an equitable doctrine, because it does not allow an infringer to avoid the literal meaning of the claims while copying the substance of the invention.

Clearly, there is tension between the public's right to notice of the bounds of the patented invention and the patentee's right to his complete invention. This tension has existed since the Supreme Court established the Doctrine in *Winans*. The closely divided Court in *Winans* struck the balance between these two policies in favor of greater protection for the patent owner.¹⁹⁶

192. Although file wrapper estoppel is usually triggered by a patentee invoking the Doctrine, it does not apply only when the Doctrine is invoked. 4 D. CHISUM, *supra* note 2, § 18.05 [4].

193. *Autogiro Co. v. United States*, 384 F.2d at 395-96.

194. *Id.* at 399-400 (purpose of the law is to benefit inventor's genius and not scrivener's talents).

195. *Id.* at 400.

196. Judge Learned Hand on two occasions articulated the tension between the two policies. *Royal Typewriter Co. v. Remington Rand, Inc.*, 168 F.2d 691, 692 (2d Cir. 1948); *Claude Neon Lights, Inc. v. E. Machlett & Son*, 36 F.2d 574, 575-76 (2d Cir. 1929). In *Claude Neon Lights*, Judge Hand stated:

The doctrine of equivalents, though well settled for many years, is anomalous if the claim is measured only by its words. . . . On the one hand, therefore, the claim is not to be taken at its face—however freely construed—but its elements

When the Supreme Court faced the Doctrine in *Graver Tank*, the Court, again closely divided, struck the balance on the side of the patent owner. The dissenting justices in both *Winans* and *Graver Tank* wanted to strike the balance on the side of notice to the public.¹⁹⁷ They believed that once the claims were written, there should be no deviation from their literal meaning.¹⁹⁸ According to the dissent in *Graver Tank*, Congress, through its enactment of the patent laws, had adequately protected patentees from fraud, piracy, and stealing.¹⁹⁹ The *Pennwalt* majority failed to address the existing tension between notice to the public and a patentee's rights. It is Judge Nies in her commentary who brought up this point.²⁰⁰

Had the *Pennwalt* test been applied to the facts in *Graver Tank* the Court would have found no infringement. In *Graver Tank*, one of the elements of the claim was an alkaline earth silicate, magnesium silicate in particular, which was not present in the accused composition.²⁰¹ Thus, under the *Pennwalt* test, an element of the claim was missing and the accused composition could not function in the same way as the claimed composition. Even if some other element present in the accused composition was a substantial equivalent of the magnesium silicate in the claimed composition, there would still have been no infringement under the *Pennwalt* test. The *Pennwalt* test states that one must look to whether each element functions in the same way, yet the only way to determine if manganese functions in the same way as magnesium is if the flux as a whole has the same properties.²⁰² Because the *Pennwalt* test does not require a court to look to the invention as a

may be treated as examples of a class which may be extended more or less broadly as the disclosure warrants, the prior art permits, and the originality of the discovery makes desirable. On the other, it is not to be ignored as a guide in ascertaining those elements of the disclosure which constitute the 'invention,' and without which there could be no patent at all. It is obviously impossible to set any theoretic limits to such a doctrine, which indeed its origin forbids, since it is in misericordiam to relieve those who have failed to express their complete meaning. Somewhat the same process is indeed inherent in the interpretation of any verbal expression, and perhaps the best that can be said is that in the case of patent claims much greater liberties are taken than would be allowed elsewhere.

Id. at 575-76.

197. *Graver Tank & Mfg. Co., Inc. v. Linde Air Prods. Co.*, 339 U.S. 605, 617 (1950) (Black, J., dissenting) (adoption of the Doctrine causes uncertainty: "manufacturer cannot rely on what the language of a patent claims . . . [he must] forecast how far a court relatively unversed in a particular technological field will expand the claims language"); *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853) (Campbell, J., dissenting) (public interest demands that patent owner describe that which he claims as his invention with "[f]ullness, clearness, exactness, preciseness, and particularity" and be held thereto).

198. *See supra* note 197.

199. *Graver Tank*, 339 U.S. at 615.

200. *Pennwalt*, 833 F.2d at 974 (Nies, J., dissenting).

201. *Graver Tank*, 339 U.S. at 610.

202. *Id.* at 611 ("[t]he trial judge found on the evidence before him that the Lincolnweld flux and the composition of the patent in suit are substantially identical in operation and in result.').

whole, there would have been no infringement in *Graver Tank*. *Graver Tank* is, therefore, effectively overruled.

The shortcomings of the *Pennwalt* test are evident from the above example which concerns a chemical composition. In most chemical compositions one is concerned with how each element interacts with the other elements of the composition. To isolate each element and determine whether an accused device contains such an element or a substantial equivalent without regard to the interaction of the element with the other elements in the accused composition does not appear to be logical. It is more reasonable to apply an element-by-element analysis to mechanical combinations where various parts or means could legitimately be analyzed without regard to the other means. However, even with regard to mechanical combinations, such an approach is inconsistent with the purpose of the Doctrine and permits a change in form to avoid infringement.

IV. IMPACT

The element-by-element test adopted by the *Pennwalt* court will have a negative impact on patent owners by making it easier for others to circumvent a patent. The *Pennwalt* test also represents a curtailment of the equitable powers of a court applying the Doctrine. These two factors may make inventors less willing to disclose their invention. Finally, practice before the patent office may also be affected.

The *Pennwalt* court held that in determining whether an accused device performs substantially the same function as a patented invention, a court should carry out an element-by-element comparison.²⁰³ In arriving at this holding, the court stated that all elements of a claim are essential and material.²⁰⁴ The holding appears to fall short of the requirements set down by the court in *Graver Tank*, namely that "[e]quivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum."²⁰⁵ The *Pennwalt* court appears to have determined that if all the elements of a claim are not present in an accused device there is no infringement, even if the device as a whole performs substantially the same function as the patented invention. A mere change in form is, therefore, enough to avoid infringement.

If a change in form can now avoid infringement, then an inventor is "at the mercy of verbalism" and it is the scrivener's talents and not the invention that are being rewarded.²⁰⁶ An inventor may not receive the complete protection to which he is entitled. In turn, this may have a chilling effect on

203. *Pennwalt*, 833 F.2d at 935.

204. *Id.* at 935 (citing *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1532-33 (Fed. Cir. 1987)).

205. *Graver Tank*, 339 U.S. at 609.

206. *Id.* at 607.

an inventor's willingness to disclose his invention.²⁰⁷ Clearly, concealment of inventions would frustrate the primary purpose of the patent system, which is to promote the progress of science and the useful arts through disclosure to the public of an inventor's creation.²⁰⁸

In addition to fostering concealment of inventions, the *Pennwalt* decision shifts the balance between the competing policies of notice to the public and protection of the patentee's rights. Under the new test, the public knows that if a device does not contain every element found in a claim then there can be no infringement. The public and the potential infringer is, therefore, fully aware of the limits of protection afforded existing patents. The price for providing this notice, however, is the narrowing of the scope of protection a patent owner is afforded.²⁰⁹

The *Pennwalt* decision also appears to affect the equitable powers of the courts. The courts have been armed with equitable power in order to secure complete justice.²¹⁰ Specifically, the Doctrine is meant to prevent the pirating of a patentee's invention through the use of minor and formalistic deviations.²¹¹ In the past, courts have had considerable discretion in looking at the particular circumstances of the case and applying the Doctrine in order to prevent the pirating of an invention. This discretion has been curtailed and a court is permitted to look only to whether the accused device has a substantial equivalent of each element of the claim. Accordingly, the courts have less equitable power and the result of this is that complete justice may not be possible in many cases.

Practice before the Patent Office may also be affected by the *Pennwalt* decision. Applicants may be less willing to accept minor amendments to their applications for fear that such an amendment may allow a copier to circumvent the patent. Applicants may also seek reissue applications more frequently in order to expand the scope of their claims. Under the *Pennwalt* test, the reissue procedure is the only way to expand the scope of the claims.²¹² Both of these actions would increase the volume of work at the Patent Office which in turn may increase the amount of time necessary to process a patent application.

207. It should be kept in mind that the burden of proving infringement is on the patent owner and the *Pennwalt* test increases this burden because the patent owner must show the presence of each and every element or its substantial equivalent. *Pennwalt*, 833 F.2d at 934.

208. U.S. CONST. art I, § 8, cl. 8.

209. This is not to say that patentees will not ask courts to find infringement under the Doctrine. Patent owners will still seek this protection, but because of the increased burden of proof put on the patentee, the patentee will probably lose more decisions than in the past. Therefore, the volume of litigation will probably remain the same.

210. *Pennwalt*, 833 F.2d at 970 (citing *Albemarle Paper Co. v. Moody*, 422 U.S. 405, 418 (1975) and cases cited therein).

211. *Id.*

212. The reissue procedure allows a patent owner to expand his claims within two years of the issue of the patent. 35 U.S.C. § 251 (1982).

V. CONCLUSION

The Federal Circuit in *Pennwalt* has established a test which states that infringement under the doctrine of equivalents must be determined by using an element-by-element analysis and not an invention as a whole analysis. In setting up this test, the *Pennwalt* court has facially retained the test set forth in *Graver Tank*, but has changed the substance of the test. This effectively overrules *Graver Tank*. The result of the *Pennwalt* test is that the public has clearer notice of what the metes and bounds of a patent are, but the patentee's scope of protection has been drastically diminished.

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