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IS THE USE OF THE DOCTRINE OF EQUIVALENTS TO FIX MISTAKES A MISTAKE?

by *Martin Adelman*¹

The doctrine of equivalents, or more accurately speaking the subject of non-textual infringement, has been the subject of innumerable law review articles and judicial decisions, but rarely have any developed any theory for deciding when, if ever, a court should go outside the literal claim language to find infringement. Usually, the literature will talk about the need for a balance between legal certainty and fairness, or will focus on the latest decisions and analyze them for consistency with earlier ones, or compare the approach taken by one country with that of another. If one seeks to determine when a court should expand a claim beyond its literal scope, one will search in vain for good answers rooted in the structure of the patent system. Perhaps it cannot be done, but I would like to give it a try in this article. To do so, I propose to use the facts of five cases. Three are from the United States, *Overhead Door Corp. v. The Chamberlain Group, Inc.*², *Sage Products, Inc. v. Devon Industries, Inc.*³ and *Pall Corp. v. Micron Separations, Inc.*⁴; one is from Japan, *Genentech, Inc. v. Sumitomo Pharmaceuticals Co.*⁵ and the fifth and final case is from the United Kingdom, *Improver Corp. v Remington Consumer Products Ltd.*⁶

Before embarking on a study of these cases, it is helpful to review some patent system basics. Essentially, there are three types of patent systems. The first, a registration system, relies solely on courts to decide on the scope of patent protection. The second relies on an administrative examination system, usually a patent office, to determine the scope of the patent. The pure examination system must have a mechanism for informing both the public and the courts empowered to enforce the patent as to just what is covered by the patent. This coverage is precisely what the patent office decided to give to the applicant by way of exclusive rights. The third is a mixed registration and examination system where the applicant can obtain a claim from the patent

1. Professor of Law and Director of the Intellectual Property Law Program at George Washington University School of Law.

2. 194 F.3d 1261, 52 U.S.P.Q.2d 1321 (Fed. Cir. 1999).

3. 126 F.3d 1420, 44 U.S.P.Q.2d 1103 (Fed. Cir. 1997).

4. 66 F.3d 1211, 36 U.S.P.Q.2d 1225 (Fed. Cir. 1995).

5. Osaka High Court, 1996, Case No. Heisei 6(ne) 3292. A translation by Professor Toshiko Takanaka of the University of Washington School of Law of the relevant parts of the courts opinion is available at <http://www.law.washington.edu/~casrip>.

6. 1990 F.S.R. 181 (Patents Ct.).

office that cannot be challenged in the infringement court, although the infringement court is free to use a registration-like system for subject matter outside of the claim language. I introduce these various systems only to caution those who would advocate important non-textual infringement law from one system to another without first looking at the nature of the systems themselves.

This article will focus on the patent system of the United States where the law gives an administrative agency, the Patent and Trademark Office ("PTO"), the task of working with an applicant to determine the appropriate scope of the patent monopoly using claims written in English. The law does not expressly permit the federal courts themselves to determine what subject matter, outside of that covered by the language of the claims worked out with the PTO, is to be considered to be within the patent monopoly. Nevertheless, the courts allow the patentee a wider coverage than that provided by the PTO under the doctrine of equivalents. This article will examine not what the courts have actually done, but what all courts functioning under a patent system similar to that of the United States should do. In order to accomplish this, it is necessary to focus first on the claiming system used by the PTO.

In nearly all examination systems there are two types of claim elements for product claims and two different types of elements for process claims. For a product claim, an element may define structure or it may define the function performed by structure. For a method claim, an element may define a step, or the function performed by the step. It is easier to distinguish a functional element from a structural element in a product claim and this article will focus on such elements. When an inventor files a patent application, the specification teaches at least one embodiment of the invention and may disclose alternative embodiments. In order to avoid having to make an inventor put numerous alternatives into the application, an application is to be understood to contain what one skilled in the art would understand from the specification. Thus, when an element of a claim is drafted in structural form it will reference structure in the specification as understood by one skilled in the art. However, one skilled in the art may know of insubstantial variations of that structure. If functional elements were not permitted in claims, an inventor would have to include, and claim, all insubstantial variations for each element known as of the filing date, if he believed that such variations were within his patent. Since functional elements are expressly permitted in United States law, and such elements cover all insubstantial variations of the disclosed element as of the issue date, a claim element that is in structural form suggests that the applicant is focusing on the claimed structure itself, a structure that must be disclosed in the specification to one skilled in the art. In essence, the applicant has a choice for each element. One may claim the element structurally, so as to emphasize that it is that element

and no other that is covered, or claim it structurally and thus inform the world that insubstantial variations known as of the issue date are covered.⁷

This brings us to the next issue, that of timing. Many insubstantial variations are developed after the filing date and many could not have been reasonably foreseen as of the filing date. Therefore, when interpreting a functional element, the law must set a time for determining insubstantial variations. If the court sets the time as of the time that the alleged infringing device was developed, then the claim changes its meaning as a function of the development date. This is inconsistent with the proposition that the meaning of a claim is fixed as of its filing date or at least as of its issue date. Surely, however, whatever date is chosen to fix the meaning of a functionally defined element, there is the need for an additional doctrine to cover after-arising equivalents. Otherwise, all that an alleged infringer would need to do is to develop an immaterial variation unknown as of the filing or issue date of the patent. In any event, so long as the patent system requires claims with a fixed meaning as of a certain date, there is a need for courts to be able to extend claim scope beyond the literal language of the claim. The same analysis is applicable to structural elements. The applicant may focus on the structural elements known or reasonably foreseeable as of the issue date, but surely the applicant cannot be held to have decided to exclude after-arising equivalents that were not reasonably foreseeable. Therefore, any claiming system that purports to fix the meaning of a claim as of the filing or issue date must have a system for dealing with after-arising equivalents that were not reasonably foreseeable and hence, not claimable. It is my opinion that covering after-arising equivalents should be the central function of a judicially administered doctrine of equivalents.

The next issue is what to do about mistakes made by the inventor. Mistakes are the failure to claim embodiments that one could reasonably foresee using the claimed invention while avoiding the claims' literal language. This problem is particularly acute if the patent system permits no substantial changes in the claims after filing. Hence, the claims would have to be in substantially final form when filed. The United States is particularly generous in dealing with mistakes. It permits an applicant to correct any mistakes in his claims until the grant of a patent. It further permits a patent owner to correct mistakes through reissue. Moreover, in American patent law there is what is known as the *Vogel* trailer practice, a practice that permits an inventor to correct all errors without

7. The recent case law on this subject is discussed at 3 MARTIN J. ADELMAN, PATENT LAW PERSPECTIVES § 3.3[3], at n. 25-28 (2d ed. 1999).

experiencing any of the limitations of reissue law.⁸

In any event, United States patent law provides ample opportunity for an inventor to correct claiming errors that were reasonably foreseeable as of the issue date. Yet, there is no sound reason for permitting courts to correct such errors. When they do so, they are essentially adopting the mixed registration examination system, since the courts are in effect examining patents by applying a hypothetical claim to the accused product and then examining the hypothetical claim for validity.⁹

Pall Corp. v. Micron Separations, Inc.

This article provides some illustrative cases. The first case, *Pall*,¹⁰ involved a non-fibrous polymeric membrane. Claim 116 is representative of the product claims:

116. A hydrophilic skinless alcohol-insoluble polyamide resin membrane sheet of alcohol-insoluble hydrophobic polyamide resin having a ratio CH₂:NHCO of methylene CH₂ to amide NHCO groups within the range of about 5:1 to about 7:1; capable when completely immersed in water of being wetted through within no more than one second, and reverting when heated to a temperature just below the softening temperature of the membrane to a hydrophobic material which is no longer wetted by water.¹¹

The accused filter was made from a polyamide with a ratio of 4 to 1 of methylene to amide groups, Nylon 46, a range outside of the literal language of the claim.¹² The history of the claim is important to understanding the appropriate scope of non-textual infringement.

Dr. Pall filed a parent patent application on May 15, 1978.¹³ He drafted the specification in order to try to claim as his filter material all alcohol insoluble polyamides that produced hydrophilic skinless membranes.¹⁴ After an interview where the breadth of the polyamide element was discussed, Dr. Pall amended his claims to define the polyamide resins by a Markush group that included all of

8. See MARTIN J. ADELMAN ET AL., CASES AND MATERIALS ON PATENT LAW 771 (1998).

9. For a discussion of hypothetical claims in United States law, see 3 MARTIN J. ADELMAN, PATENT LAW PERSPECTIVES § 3.4[1], at n.373 (2d ed. 2000).

10. *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 36 U.S.P.Q. 2d 1225 (Fed. Cir. 1999).

11. *Id.* at 1217.

12. *Id.*

13. See *Pall Corp. v. Micron Separations*, 792 F. Supp. 1298, 1308 (D. Mass. 1992).

14. *Id.*

the resins used in the operative embodiments of the specification.¹⁵ Dr. Pall explained:

As indicated at the interview, Claims 1, 32, 56, 67, and 75, although not rejected on the grounds of undue breadth, are amended because, on the basis of research done since this application was filed, the applicant now considers that the process described and claimed herein is actually applicable only to polyamide resins which are polymers of hexamethylene diamine and aliphatic saturated dicarboxylic acids having from six to ten carbon atoms. As indicated at Page 22, Lines 12 to 14, the preferred polyamide resins now recited in these claims in a Markush group are polyhexamethylene adipamide (Nylon 66), poly-ε-caprolactam (Nylon 6), and polyhexamethylene sebacamide (Nylon 610). These embrace the limits of the class of saturated aliphatic dicarboxylic acids having from six (adipic) to ten (sebacic) carbon atoms.¹⁶

Before the PTO acted on this amendment, Dr. Paul filed a continuation-in-part application, redefining the invention by including in the claims for the first time the methylene to amide ratio range limitation.¹⁷ He explained that the application Serial No. 905,698 had been refiled to provide basis for a narrow subclass of polyamide resins disclosed in Serial No. 905,698 that form such skinless hydrophilic membranes.¹⁸ All members of this class have a ratio CH[2]:NHCO of methylene CH [2] to amide NHCO groups within the range from about 5:1 to about 7:1, including polyhexamethylene adipamide (Nylon 66), poly-ε-caprolactam (Nylon 6), polyhexamethylene sebacamide (Nylon 610), poly-7-aminoheptanoamide (Nylon 7), polyhexamethylene azeleamide (Nylon 69), and mixtures of two or more thereof, as well as mixtures thereof with higher polyamide homologues such as polyhexamethylene dodecandiamide (Nylon 612) in portions such that the mixture has an average of CH [2]:NHCO ratio within the stated range.¹⁹ The first three polyamides, Nylon 66, Nylon 6 and Nylon 610, are preferred.²⁰

The other polyamides disclosed in Serial No. 905,698 have been found not to form hydrophilic skinless membranes. Some of them, those that have a ratio CH₂:NHCO of methylene CH₂ to amide NHCO groups within the range from

15. *Id.* at 1310.

16. *Id.*

17. *Id.* at 1311.

18. *Id.*

19. *Id.*

20. *Id.*

about 7:1 to about 12:1, form skinless liqophilic membranes. The others form hydrophobic skinned membranes.²¹

The examiner did not reject any of the continuation-in-part claims on art.²² However, in his first office action, the examiner rejected all of the ratio range claims.²³ Dr. Pall responded:

The range of CH₂:NHCO ratios within the range from about 5:1 to about 7:1 is actually rather narrow, and it is moreover well supported in the disclosure. The ratio of 5:1 requires there to be five CH₂ to one NHCO group, and the ratio of 7:1 requires there be seven CH₂ groups to one NHCO group. These limits constrain a rather narrow range of CH₂:NHCO ratios, and clearly exclude the vast majority of polyamide resins, all of which can of course be prepared from diamines and dicarboxylic acids or aminocarboxylic acids having virtually infinite number of carbon atoms, in virtually infinite permutations.

The specification at the bottom of page 22 lists a number of commercially available polyamide resins that fall within the limits of the ratio range, and these are as follows:

Nylon 6	(CH ₂) ₅ CONHn	5:1
Nylon 66	(CH ₂) ₆ NHCO CH ₂ 4CONHn	5:1
Nylon 610	(CH 2) 6NHCO (CH ₃) 8CONHn	7:1
Nylon 7	(CH ₂) ₅ CONHn	6:1
Nylon 69	(CH ₂) ₆ NHCO (CH ₂) ₇ CONHn	6.5:1

Mixtures of these with each other or with polyamides outside the range but with an average ratio within the limits as well as other polyamides within the range can of course be conceived, but the above should make it clear that those listed are virtually all of the permutations based on hexamethylene diamine, or on aminocarboxylic acids, of which only Nylon 8 (CH 2) 6CONHn is not specified.²⁴

After reviewing Dr. Pall's response, the examiner allowed the pending

21. *Id.*

22. *Id.*

23. *Id.*

24. *Id.* at 1311.

claims.²⁵ In spite of the literal language of the claims, including 116, and the fact that the examiner would only allow nylons that were enabled by the specification, the court permitted enlargement of 116 so as to reach Nylon 46 because it was not commercially available at the time of Dr. Pall's invention. Thus, given its close similarity in chemical structure and the identity of function, way, and result, the court deemed it to be an equivalent to the claimed membranes of claim 116. In essence, the court treated Nylon 46 as an after-arising equivalent even though it was known chemically since 1942 because there was no practical way for Dr. Pall to experiment with it until it became commercially available.

The court did not, however, discuss whether one skilled in the art at the time of the filing of the Pall application would have considered it obvious that Nylon 46 would function in the same way as the claimed nylons. This question should be asked because if the answer is no, then we are not talking about the same invention. Merely because Nylon 46 turns out to function in the same way as the claimed nylons to make the patented filters does not make it an equivalent, because the discovery that it works in the same way may have been in fact non-obvious, and thus, a different invention from the one claimed. With this important caveat, the approach of the Federal Circuit in *Pall* is the one that I advocate for the patent system. I will demonstrate why all other approaches are misguided.

Genentech, Inc. v. Sumitomo Pharmaceuticals Co.

There is an important infringement issue from the worldwide t-PA litigation²⁶, particularly in *Sumitomo Pharmaceuticals*.²⁷ The issue presents a difficult question regarding foreseeability of the accused gene. The case involved patents relating to the discovery of the gene for an important human protein, t-PA.²⁸ The key to the invention was that it was difficult at the time of the filing of the patent application to find the gene that coded for t-PA.²⁹ Thus,

25. *Id.*

26. See 3 MARTIN J. ADELMAN, PATENT LAW PERSPECTIVES § 3.4[1], at n.126 (2d. ed. 1994).

27. *Genentech, Inc. v. Sumitomo Pharm. Co.*, Osaka High Court, 1996, Case No. Heisei 6(ne) 3292.

28. *Id.*

29. *Id.*

finding the human gene was the important contribution of Genentech.³⁰ The gene used by Sumitomo differed from the claimed gene in that it coded for a protein, met-t-PA, that differed from t-PA by one amino acid.³¹ Specifically, there were two t-PA patents in suit in Japan.³² The first patent, referred to as invention A, includes three independent claims, one directed to the claimed t-PA, the second to a method of making it, and the third to a method of using it.³³ All of them include the following critical language: "and comprises a segment of 89th to 527th amino acid as indicated in the appendix 1."³⁴ The only claim of invention B reads as follows:

[A] microorganism, yeast, and mammal cell transformed by a recombinant expression vector containing a DNA sequence encoding human tissue plasminogen activator, having a sequence of 1st to 527th amino acids listed in the attached appendix 1.³⁵

Since met-t-PA substitutes methionine for valine at position 245, any gene or organism transformed by this gene that codes for met-t-PA would not literally infringe either patent. The Osaka High Court, in deciding whether to find that the genes and products derived from them that code for met-t-PA should infringe under the Japanese doctrine of equivalents, relied on the following factual findings:

- (1) Valine and methionine behave similarly in structuring three dimensional protein structure.
- (2) Transformation from valine to methionine in protein amino acid sequences occurs relatively frequently. This transformation does not affect the function of the protein (trivial transformation).
- (3) t-PA's 245th position is buried in the hydrophobic region of the three dimensional structure of the protein and has no significant role in relation to biological activity.
- (4) If a sequence of amino acids is identified, one skilled in the art could have manufactured a t-PA variation wherein some amino acid residues are replaced,

30. *Id.*

31. *Id.*

32. *Id.*

33. *Id.*

34. *Id.*

35. *Id.*

deleted or added by manufacturing t-PA's cDNA and changing a segment of the canonical amino acid sequence in the t-PA.

(5) The significance of Patented Inventions A and B is to express a t-PA cDNA encoding a recombinant t-PA which provides a biological activity.

(6) In the scientists' view, the significance of the first successful cloning of a t-PA c-DNA and producing a recombinant t-PA is vastly greater than subsequently repeating the cloning of t-PA by making reference to the disclosure of the first cloning procedure.

(7) Production of a different form of t-PA by making reference to the amino acid sequence of t-PA has no practical use, unless the different form of t-PA provides improved characteristics.

(8) Cloning errors occur very frequently. In most cases, such errors result from replacements of insignificant amino acid residues with similar amino acid residues which do not affect the function of the protein. When a protein resulting from a cloning error has the same function as that of the original protein, the error results from a replacement of insignificant amino acids with similar amino acids. Therefore, one skilled in the art could have known that the protein in a different form resulting from the error would have the same function as the original protein.³⁶

An important question that the court itself answered is whether the failure to obtain a claim covering met-t-PA was due to attorney error. The court said that it was not, and explained as follows:

These facts in the patent prosecution indicate that the limitation of amino acid sequence was introduced to meet the requirement provided in Article 36, because variations included in the original claims were not supported by the disclosure in the specification.

This assertion suggests that Japanese patent law would not permit claims that were broader than what was precisely disclosed. This is not the place to discuss Japanese law on enablement, but in the United States one can claim the full scope of what one has put in the possession of the public. Based on the facts set forth by the court, the PTO should have permitted Genentech to claim the t-PA gene and genes coding for t-PA like proteins. Therefore, it is unclear whether the gene for met-t-PA was an after-arising equivalent or one that was

36. *Id.*

reasonably foreseeable, and hence, should have been encompassed by the claims. This case is an example of a tough case at the margin.

Sage Products, Inc. v. Devon Industries, Inc.

We now turn to an easy case and one that is the high-point of Federal Circuit jurisprudence on the doctrine of equivalents, *Sage Products*,³⁷ where the court dealt with a simple mechanical patent with inadequate claims, the apparent result of poor lawyering. *Sage Products* involved a patent, US Patent No. 4,779,728 ("728"), directed to a disposal container with a slot at its top to allow entry of waste materials into the container and with constrictive barriers above and below that slot to restrict access to the interior of the container.³⁸ The only independent claim of the 728 patent reads as follows:

1. A disposal container comprising:
 - a. a hollow upstanding container body,
 - b. an elongated slot at the top of the container body for permitting access to the interior of the container body,
 - c. barrier means disposed adjacent said slot for restricting access to the interior of said container body, at least a portion of said barrier means comprising
 - i. a first constriction extending over said slot, and
 - ii. a complementary second constriction extending beneath said slot, and
 - d. a closure disposed adjacent said slot.³⁹

The accused device did not literally infringe for several reasons, including the fact that the first constriction did not extend over the slot.⁴⁰ The court said that it had to decide whether an internal constriction should be covered by court decision. In deciding that it should not be covered by a court decision, the court made the following remarks:

37. *Sage Prods. v. Devon Indus.*, 126 F.3d 1420 (Fed. Cir. 1997).

38. *Id.* at 1422.

39. *Id.*

40. *Id.* at 1423.

The claim at issue defines a relatively simple structural device. A skilled patent drafter would foresee the limiting potential of the "over said slot" limitation. No subtlety of language or complexity of the technology, nor any subsequent change in the state of the art, such as later-developed technology, obfuscated the significance of this limitation at the time of its incorporation into the claim. . . . If Sage desired broad patent protection for any container that performed a function similar to its claimed container, it could have sought claims with fewer structural encumbrances. Had Sage done so, then the Patent and Trademark Office (PTO) could have fulfilled its statutory role in helping to ensure that exclusive rights issue only to those who have, in fact, contributed something new, useful, and unobvious. Instead, Sage left the PTO with manifestly limited claims that it now seeks to expand through the doctrine of equivalents. However, as between the patentee who had a clear opportunity to negotiate broader claims but did not do so, and the public at large, it is the patentee who must bear the cost of its failure to seek protection for this foreseeable alteration of its claimed structure. . . .

This court recognizes that such reasoning places a premium on forethought in patent drafting. Indeed this premium may lead to higher costs of patent prosecution. However, the alternative rule -- allowing broad play for the doctrine of equivalents to encompass foreseeable variations, not just of a claim element, but of a patent claim -- also leads to higher costs. Society at large would bear these latter costs in the form of virtual foreclosure of competitive activity within the penumbra of each issued patent claim. Because the doctrine of equivalents blurs the line of demarcation between infringing and non-infringing activity, it creates a zone of uncertainty, into which competitors tread only at their peril. . . . Given a choice of imposing the higher costs of careful prosecution on patentees, or imposing the costs of foreclosed business activity on the public at large, this court believes the costs are properly imposed on the group best positioned to determine whether or not a particular invention warrants investment at a higher level, that is, the patentees.⁴¹

The court in *Sage Products* has it right. It represents the only Federal Circuit opinion that correctly explained when it is appropriate for a court to itself find infringement for a product or process outside the language of the claims. The Federal Circuit ordinarily simply states that equivalence is a question of fact and then decides whether to expand a claim without falling back on any sound basis for doing so. A recent example is *Overhead Door v. The Chamberlin Group, Inc.* The *Overhead Door* case is a wonderful case because the patentee

41. *Id.* at 1425.

knew that it erroneously left out a disclosed equivalent and filed a broadening reissue application to fix the error.

Overhead Door v. The Chamberlin Group, Inc.

In *Overhead Door*, the patent in suit, Re. 35,364 ("364"), covers an automatic microprocessor-controlled garage door opener that opens and closes a garage door when it receives a code stored in its memory from a portable transmitter.⁴² The garage door opener has two modes.⁴³ One is a programmable mode where it is capable of recording the code sent to it by a portable transmitter.⁴⁴ The other is the operational mode where it opens and closes the garage door in response to the receipt of a code from the portable transmitter that is associated with a code stored by the garage door opener.⁴⁵ The garage door opener is switched from one state to the other by a two position mechanical switch.⁴⁶ In order to be responsive to more than one portable transmitter, the garage door opener is able to store five different codes in its memory.⁴⁷ In one embodiment, illustrated in Figure 2, the positions for storage of codes in the memory are chosen by a mechanical switch that has five mechanical positions.⁴⁸ Figure 3 suggests the use of a software implement technique for choosing the memory location for storage of a code from a portable transmitter, since it shows a software pointer that chooses the memory location.⁴⁹

Nevertheless, the only independent claim in the original patent, claim 1, reads as follows:

A garage door operator for a garage door comprising, a garage door operation mechanism with an output shaft connected to said garage door to open and close it, a radio receiver, a decoder connected to receive the output of said radio receiver, a microprocessor connected to receive the output of said decoder and to said garage door operation mechanism to energize it, a switch moveable

42. *Overhead Door Corp. v. The Chamberlin Group, Inc.*, 194 F.3d 1261, 1264, 52 U.S.P.Q. 1321 (Fed. Cir. 1999).

43. *Id.*

44. *Id.*

45. *Id.*

46. *Id.*

47. *Id.*

48. *Id.*

49. *Id.*

between program and operate positions connected to said microprocessor to place said microprocessor in the operate or program mode, a memory means for storing a plurality of addresses connected to said microprocessor when said switch is in the program position, a memory selection switch connected to said microprocessor, a plurality of radio transmitters with different codes, said memory selection switch setable in a first position at a time when a first one of said radio transmitters is energized so that the code of said first transmitter will be stored in said memory means and said memory selection switch set in a second position at a time when a second one of said radio transmitters is energized so that the code of said second transmitter will be stored in said memory means, and said microprocessor placed in the operate mode when said switch is in the operate position so that either or both of said first and second radio transmitters when energized cause said microprocessor to energize said garage door operator mechanism.⁵⁰

As one no doubt suspects, the accused device does not have a mechanical switch whose position determines where to store a code. Instead, it uses software to determine an empty place in memory that is capable of storing a code.⁵¹ However, it uses a different algorithm for its software than the algorithm shown in Figure 3 for choosing where to store the new code.⁵² Nevertheless, the inventors knew that there were ways other than using a mechanical switch to change the storage location of the registers that stored the codes, as demonstrated by the system software disclosed in Figure 3. Thus, it is not surprising that before the two-year period for filing a broadening reissue was up, the inventors sought to correct their obvious error and ultimately obtained reissue claim 5:

An operator for controlling operation of equipment comprising: a radio receiver, a decoder connected to receive the output of said radio receiver, a microprocessor connected to receive the output of said decoder and to said equipment to energize it, first switch means for selection between program and operate positions connected to said microprocessor to place said microprocessor in the operate or the program mode, a memory means for storing a plurality of addresses connected to said microprocessor when said first switch means is in the program position, a memory selection second switch means connected to said microprocessor, a plurality of radio transmitters with different codes, said memory selection second switch means being adapted to select a first position at

50. *Id.* at 1265.

51. *Id.*

52. *Id.*

a time when a first one of said radio transmitters is energized so that the code of said first transmitter will be stored in said memory means and said memory selection second switch means being adapted to select a second position at a time when a second one of said radio transmitters is energized so that the code of said second transmitter will be stored in said memory means, and said microprocessor placed in the operate mode when said first switch means is in the operate position so that either or both of said first and second radio transmitters, when energized cause said microprocessor to energize said equipment.⁵³

In spite of the inventors' awareness that they did not properly claim their invention in the original patent, the Federal Circuit commented on the possibility of extending the mechanical second switch of claim 1 so as to cover the accused software implementation:

The record contains considerable evidence, including several reports and declarations by Chamberlain's expert, Dr. Rhyne, that one of ordinary skill in the art would find the Intellicode's software-driven memory selection system insubstantially different from the hardware switch of claim 1. Dr. Rhyne averred in his June 2, 1997 report: "[it is a] fundamental and well understood tenet of the computing art [that] . . . 'any software process can be transformed into an equivalent hardware process, and any hardware process can be transformed into an equivalent software process.'" . . . Dr. Rhyne stated that this "dualistic transformation," known as the "hardware/software" trade-off, effectively means that the selection of a software pointer for a microprocessor versus a hardware switch to control a microprocessor-based system is simply a matter of design choice. This record evidence shows that one of skill in the art would recognize these alternative systems as interchangeable substitutes. Drawing all reasonable inferences in favor of Chamberlain, as this court must in reviewing the summary judgment of non-infringement, this court concludes that Dr. Rhyne's statements and supporting citations to computer science literature show a genuine issue of material fact precluding summary judgment.⁵⁴

There can be little doubt that the court believed that it was appropriate to fix a mistake by using the doctrine of equivalents to say that a mechanical switch is a meaningless limitation. The court therefore, and not the PTO, will decide whether the patentee should have more than it was given by the PTO, since when the application was filed, the software implement switches were old as exemplified by the disclosure itself. Yet, permitting a court to twist the notion

53. *Id.*

54. *Id.* at 1269-70.

of a mechanical switch to possibly cover a software-implemented switch is surely twisting all meaning out of language.

Claim 5 presents a different story. The court's discussion here is sound:

In construing claim 5, the district court determined the term "memory selection second switch means" encompasses the same scope as the "memory selection switch" of claim 1. Specifically, the district court determined that "memory selection second switch means" covers only the mechanical switch of Figure 2, not the software embodiment of Figure 3. The written description of the '364 patent and the prosecution history, however, reveal a broader meaning of "memory selection switch means."

As previously explained in this court's analysis of claim 1, Figure 3 illustrates a flow diagram "describing both the operate and program modes of the invention." The two lower-right corner dialog boxes of Figure 3 describe steps to "store code at location pointed *to* by the code location pointer" and "increment code location pointer[;] if pointer increments over five then load code location pointer with one. Dr. Rhyne's expert testimony shows that one of ordinary skill in the computer science art would understand the underlined terms to describe software operations.

Although software operations do not fall within the literal scope of the "memory selection switch" in claim 1, the reissue prosecution history also discloses a broader reading for the "switch means" of claim 5. First, the patentees' representation to the Patent and Trademark Office in its November 29, 1989 sworn declaration indicated their intent to include the algorithm of Figure 3 as a "corresponding structure" for the switch means. The patentees stated:

We believe the aforesaid Letters Patent to be wholly or partly inoperative or invalid by reason of our claiming less than we had a right to claim in the patent. More specifically, we believe the sole independent original claim [i.e., claim 1 of the '118 and now claim 1 of the '364 patent] is too narrow in three respects:

* * *

(c) The claim requires a "switch moveable" and a "memory selection switch" but should have required a --first switch means-- and a --memory selection switch means--, respectively, because switch means includes electronic switches as well as mechanical switches.

While this statement weighs against construing claim 1 to include software

operations, it gives a broader reading to claim 5. This statement evinces the patentees' use of the term "switch means" to include microprocessor operations driven by software, i.e., "electronic" switches, as opposed to a mechanical switch of Figure 2. The patentees' use in claim 5 of the term "switch means" rather than "switch" and "being adapted to select" rather than "setable" and "set," to describe software operations, further support a broader construction.

Later in the reissue proceedings, the patentees argued in response to an anticipation rejection:

Applicants' method and apparatus is intended to simplify the remote control of equipment by code transmitters. . . . Such simplifications are provided by including multiple storage locations in the receiver and including a programming routine which receives and stores codes transmitted from the code transmitters of the system. . . .

This statement further supports reading "switch means" to include structure corresponding to Figure 3.

The differences in claim language, bolstered by the patentees' statements during the reissue proceedings, cause this court to reach a broader construction for claim 5 than for claim 1. . . . The district court erred in ruling that only the mechanical switch in Figure 2 is "corresponding structure" for the claimed "switch means." "Switch means," when properly construed, also covers the software-based embodiment described in Figure 3.⁵⁵

In other words, the patentee fixed the error and will no doubt prevail on claim 5. The only reason for asserting claim 1 is to avoid the doctrine of intervening rights. Sound law would have rejected the claim based on claim 1 and found infringement under claim 5. Why should the law on non-textual infringement also permit fixing errors? As asserted earlier, it should not. United States patent law has ample methods in place to cover equivalents that are mistakenly omitted from the original claims as shown by reissue claim 5 in *Overhead Door*.

Improver Corp. v Remington Consumer Products Ltd.

A more difficult question is how to decide whether the doctrine of equivalents should cover all after-arising equivalents or only those that would obviously function in the same way. A last case addresses this issue. It is one of a series of cases involving infringement of a European patent corresponding to

55. *Overhead Door*, 194 F.3d at 1272-73.

US patent 4,524,772 ("772") covering a motorized depilatory known as the Epilady. It essentially uses a coiled spring attached at both ends to a motor. The motor drives one end of the spring clockwise and the other end counterclockwise and the rotating curved spring pulls out hair. The Epilady was a great commercial success. The accused device, sold under the name Smooth and Silky, is the subject of United States patent No. 4,726,375 ("375"). It essentially substitutes a plastic (rubber) tube with grooves for the spring. It was specifically designed to improve on the Epilady design. The independent claim of the European patent corresponding to the 772 reads as follows:

An electrically powered depilatory device comprising: a hand held portable housing (2); motor means (4, 4') disposed in said housing; and a helical spring (24) comprising a plurality of adjacent windings arranged to be driven by said motor means in rotational sliding motion relative to skin bearing hair to be removed, said helical spring (24) including an arcuate hair engaging portion arranged to define a convex side whereat the windings are spread apart and a concave side corresponding thereto whereat the windings are pressed together, the rotational motion of the helical spring (24) producing continuous motion of the windings from a spread apart orientation at the convex side to a pressed together orientation on the concave side and for the engagement and plucking of hair from the skin of the subject, whereby the surface velocities of the windings relative to the skin greatly exceed the surface velocity of the housing relative thereto.⁵⁶

The *Improver* court, using British non-textual infringement law, had to decide whether the substitution was obvious. One issue before the court was what was meant by the obviousness test used in British law. Did it simply ask whether the new combination was obvious over the old? If we assume that the 375 patent was valid, the answer would have to be in the negative. Alternatively, did obviousness mean that what is alleged to be an equivalent is treated as already known, but what is not known is whether that after-arising equivalent would have been an obvious equivalent as of the filing date. The court, speaking through Sir Leonard Hoffmann (now Lord Hoffmann), answered that it was the latter:

Mr. Young interpreted this question to mean that the variant must be one which would have suggested itself to the skilled man as an obvious alternative to the thing denoted by the literal meaning. In this case, he said, the term "helical spring" did not suggest a rubber rod as an obvious alternative. On the

56. See *Improver Corp. v Remington Consumer Prods. Ltd.*, 1990 F.S.R. 181 (Patents Ct.).

contrary, it was an inventive step. He relied upon the evidence of Dr Laming who said that mention of a helical spring would not have made him think of a rubber rod and that the choice of the latter was innovative.

I do not think that this is what Lord Diplock meant by the question and I think that Mr Young has been misled by Lord Diplock's use of the word "obvious" into thinking that he must have been intending to refer to the rule that an obvious improvement is not an inventive step. In my view the question supposes that the skilled man is told of both the invention and the variant and asked whether the variant would obviously work in the same way. An affirmative answer would not be inconsistent with the variant being an inventive step. For example, the choice of some material for the bendy rod which was a priori improbable (eg on account of its expense) but had been discovered to give some additional advantage (eg painless extraction) might be a variant which obviously worked in the same way as the invention and yet be an inventive step. Nor would it matter that the material in question, being improbable, would not have suggested itself to the skilled man as an obvious alternative. Questions such as these may be relevant to the question of construction (Lord Diplock's third question) but not at this stage of the inquiry. Dr Laming and Dr Sharp, the eminent engineer called as an expert by the plaintiff, agreed that it would have been obvious to the skilled man that the attributes which enabled the helical spring to function in the way described in the specification were that it was capable of rotating, capable of transmitting torque along its length to resist the forces involved in plucking hairs, bendy (to form an arc) and slitty (to entrap hairs by the opening and closing effect of rotation). They also agreed that it would have been obvious that any rod which had these qualities in sufficient degree and did not have other defects such as overheating or falling to bits would in principle work in the same way and that the rubber rod plainly belonged to that class. On this evidence the second question must in my judgment be answered yes. I express no view on whether the rubber rod was also an inventive step.

* * *

On the other hand, the evidence shows that although the rubber rod could be used in a device which would function in the way described in claim 1 of the patent in suit, it would work only in a limited number of embodiments. In particular, it could not be used in the loop formation described as the preferred embodiment.⁵⁷

57. *Id.*

This test is an appropriate method for limiting equivalents to those that would obviously work in the same way as of the filing date. Thus, if one skilled in the art would have believed, as of the filing date of the Epilady patent, that the rubber rod of the Smooth and Silky unit would not function in the same way as the spring, then it represents a different invention even if it should turn out that it does in fact operate in the same way. However, one should study the United States patents for both the Epilady and the Smooth and Silky units and try and decide for oneself as to whether the latter should be viewed as an infringement of the claim discussed above.

CONCLUSION

Limiting the doctrine of non-textual infringement to obvious after-arising equivalents will eliminate the need for many of the limitations currently used by the courts, such as prosecution history estoppel and prior art rejections. Obviously, one cannot disclaim during prosecution that which has not been invented based on prior art, since by definition we are talking about after-arising equivalents. Moreover, this approach is consistent with the Supreme Court's focus on the time of infringement as the time for measuring equivalency. The Court was well aware that this permitted the inclusion of after-arising equivalents. Finally, this approach is consistent with the Court's admonition not to squeeze all meaning out of a claim element under the doctrine of equivalents, since after-arising equivalents are those that are not reasonably foreseeable.⁵⁸

58. See 3 MARTIN J. ADELMAN, PATENT LAW PERSPECTIVES § 3.4[1], at n.280 (2d ed. 1997) (discussing *Warner-Jenkinson Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17 (1997)).