THE DOCTRINE OF EQUIVALENTS IN VARIOUS PATENT REGIMES—DOES ANYBODY HAVE IT RIGHT?

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I INTRODUCTION

Most jurists would admit that determining patent scope is perhaps the most difficult aspect of patent law, the world over. It is no wonder then that there are considerable differences in attitudes towards the doctrine of equivalents—a doctrine that is often central to the issue of patent scope. This paper will consider such differences from the perspective of four key patent jurisdictions i.e. the US (often considered the forerunner of the doctrine of equivalents), the UK (which has been openly hostile to such a doctrine), Germany and Japan.

While each jurisdiction is tackled separately by experts within that jurisdiction, we have attempted to weave the separate portions into one cohesive whole by posing the

* This article is in honor of The Former Hon Sir Nicholas Pumfrey, now deceased. The authors are Nicholas Pumfrey, and the rest listed alphabetically, Martin Adelman, Shamnad Basheer, Raj S. Davé, Peter Meier-Beck, Yukio Nagasawa, Maximilian Rospatt and Martin Sulsky. Although a collective piece, the US position is authored by Raj S Davé, Martin Sulsky and Martin Adelman; and the UK position by The Former Hon Sir Nicholas Pumfrey and Shamnad Basheer; the German position by Judge Peter Meier-Beck and Maximilian Rospatt and the Japanese portion by Yuko Nagasawa. The last section dealing with the hypothetical claim was prepared by Shamnad Basheer and Raj S. Davé.

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question: ‘The Doctrine Of Equivalents In Various Patent Regimes—Does Anybody Have It Right?’

In order to extrapolate the essence of the allegedly different tests in the different jurisdictions, we have presented a hypothetical claim and attempted to construe it, applying the law that exists (as of today) in each of these jurisdictions. The results are fairly interesting.

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1 To the extent that the UK does not recognize a separate ‘doctrine of equivalents’, the question may seem incongruous. However, the term doctrine of equivalents is used in the title in a wider sense to even include analogous principles of claim construction that would capture ‘non literal’ infringement, including the doctrine of purposive construction, as used in the UK.
II US POSITION: UNFORESEEABILITY—THE TOUCHSTONE OF THE DOCTRINE OF EQUIVALENTS

A Judicial Underpinnings for the Doctrine of Equivalents

Why should we have a doctrine of equivalents? This fundamental question still remains unanswered or at least unanswered consistently, in different patent regimes. The United States patent laws are found in Title 35 of the United States Code. Section 271 deals with infringement. However, a careful review of section 271 shows that it codifies the statute on literal or textual infringement, but the doctrine of equivalents is the result of case law.

Almost 150 years ago, the courts in the United States before the current claiming system was developed, mentioned equivalents in Winans v. Denmead. In Winans, Winans’ patent described a railcar with a conical cavity for carrying coal, resulting in an even weight distribution of coal in the car and a lower center of gravity. The accused railroad car had octagonal and pyramidal cavities instead, thus providing the same result as Winans’ railcar without falling within the literal language of Winans’ patent. The trial court found no infringement, but a sharply divided Supreme Court found infringement under the doctrine of equivalents, applying the following logic:

The exclusive right to the thing patented is not secured, if the public are at liberty to make substantial copies of it, varying its form or proportions. And, therefore, the patentee, having described his invention, and shown its principles, and claimed it in that form which most perfectly embodies it, is, in contemplation of law, deemed to claim every form in which his invention may be copied, unless he manifests an intention to disclaim some of those forms.

After the development of a modern claiming system, the doctrine of equivalents was firmly established in law by the landmark decision of Graver Tank & Manufacturing

3. Id.
4. See id. at 340.
5. Id. at 343.
Company v. Linde Air Products Company. Graver Tank guided United States doctrine of equivalents for almost the entire latter half of the twentieth century. In Graver Tank, the patent at issue claimed a flux containing an alkaline earth metal silicate. The accused flux instead used manganese silicate, which is not an alkaline earth metal silicate. Based on evidence showing that manganese silicate and an alkaline earth metal silicate “are substantially identical in operation and in result,” the Supreme Court affirmed a finding of infringement under the doctrine of equivalents.

Though finding the patented and accused devices substantially identical in operation and in result, Graver Tank adopted a three part function/way/result “tripartite test” for determining equivalency. Subsequent decisions faithfully adopted the function/way/result test, also known as the tripartite test, as the test for equivalence without actually questioning the role of the “way” prong of the tripartite test.

To justify the application of the doctrine of equivalents, the Court in Graver Tank relied on the need to protect patentees from “the unscrupulous copyist” making “unimportant and insubstantial changes and substitutions in the patent which, though adding nothing, would be enough to take the copied matter outside the claim . . . .” Of course Graver Tank was a very unusual case since the accused flux was disclosed in the patent as a flux that embodied the invention and the accused flux

7. Id. at 611.
8. Id. (emphasis added).
9. Graver Tank does not confirm that “operation” means “function” plus “way,” but it seems plausible. The Court notes: “[A] patentee may invoke this doctrine to proceed against the producer of a device ‘if it performs substantially the same function in substantially the same way to obtain the same result.’” Graver Tank, 339 U.S. at 608 (quoting Sanitary Refrigerator Co. v. Winters, 280 U.S. 30, 42 (1929)); see Union Paper-Bag Mach. Co. v. Murphy, 97 U.S. 120, 125 (1877).
was claimed as it was incorporated in the claims directed to the metal silicate genus. However, the metal silicate claims were held invalid by the Supreme Court because one or more metals were inoperative. Thus *Graver Tank* was unique as the patent clearly disclosed and claimed the accused product and the doctrine of equivalents was only used to expand a narrow claim when the claims covering the accused product were held invalid for technical reasons. Thus all of its flowery language was dicta in all the cases that used it in the second half of the twentieth century as all of them concerned cases where the patentee never literally claimed the accused product or process.

In any event, starting from the *Winans* decision, the idea that a patentee could obtain legal rights against accused infringers who avoided the literal language of a patent was controversial. For example, writing for a four-Justice dissenting minority in *Winans*, Justice Campbell argued that the patent law requires a patentee to “particularly ‘specify and point out’ what he claims as his invention,” and that “[f]ull[ness], clearness, exactness, preciseness, and particularity, in the description of the invention” are essential to avoid oppressive litigation.  

Subsequently, Justice Black, in dissent in *Graver Tank*, stated:

I heartily agree with the court that “fraud” is bad, “piracy” is evil, and “stealing” is reprehensible. But in this case, where petitioners are not charged with any such malevolence, these lofty principles do not justify the Court’s sterilization of Acts of Congress and prior decisions, none of which are even mentioned in today’s opinion.

Justice Black further stated:

Hereafter a manufacturer cannot rely on what the language of a patent claims. He must be able, at the peril of heavy infringement damages, to forecast how far a court relatively unversed in a particular technological field will expand the claim’s language after considering the testimony of technical experts in that field.

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14. *Id.* at 617 (Black, J., dissenting).
Despite the objections of some Justices in *Graver Tank*, which of course did not apply to the facts of the case before them as the public was fully informed that the manganese silicate was considered within the scope of the invention, the doctrine of equivalents flourished after *Graver Tank*, leading to a host of significant but often diverging decisions by the Court of Appeals for the Federal Circuit. On the important issue of the doctrine of equivalents, two schools of thought developed over the years at the Federal Circuit. “One school leaned toward fair protection; the other toward clear notice. Each found support in the language of the *Graver Tank* opinion.”

Due to the divergent views of the members of the two schools, the doctrine of equivalents took “on a life of its own, unbounded by the patent claims.”

In this tumultuous post-*Graver Tank* environment, different formulations as to what is “equivalent” developed, but none of these formulations clearly explain why we should have a doctrine of equivalents. Even in *Warner-Jenkinson*, the Supreme Court did not offer a clear formulation for the test of infringement under the doctrine of equivalents. The only clear formulation in the judicial literature both in the United States and the rest of the world is found in the concurring opinion of Judge Rader in *Johnson & Johnston Assocs. Inc. v. R.E. Serv. Co.*, which is a precursor to the Supreme

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17. See e.g., *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512 (Fed. Cir. 1995), rev’d, 520 U.S. 17 (1997), in which the Federal Circuit moved away from the function/way/result formulation of the doctrine. Instead, the court explained that “the application of the doctrine of equivalents rests on the substantiality of the differences between the claimed and accused products or processes, assessed according to an objective standard.” *Id.* at 1518.
18. *Warner-Jenkinson*, 520 U.S. at 40 (“In our view, the particular linguistic framework used is less important than whether the test is probative of the essential inquiry: Does the accused product or process contain elements identical or equivalent to each claimed element of the patented invention?”).
Court decision in *Festo*.20 Judge Rader explained as follows:

While endorsing the results and reasoning of the court, I would offer an alternative reasoning. This alternative would also help reconcile the preeminent notice function of patent claims with the protective function of the doctrine of equivalents. This reconciling principle is simple: the doctrine of equivalents does not capture subject matter that the patent drafter reasonably could have foreseen during the application process and included in the claims. This principle enhances the notice function of claims by making them the sole definition of invention scope in all foreseeable circumstances. This principle also protects patentees against copyists who employ insubstantial variations to expropriate the claimed invention in some unforeseeable circumstances.

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In general, the Supreme Court and this court have attempted to deal with these competing [definitional and public-notice functions] principles by placing limits on non-textual infringement. … [A] foreseeability bar would concurrently serve both the predominant notice function of the claims and the protective function of the doctrine of equivalents. When one of ordinary skill in the relevant art would foresee coverage of an invention, a patent drafter has an obligation to claim those foreseeable limits. This rule enhances the notice function of claims by making them the sole

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definition of invention scope in all foreseeable circumstances. When the skilled artisan cannot have foreseen a variation that copyists employ to evade the literal text of the claims, the rule permits the patentee to attempt to prove that an “insubstantial variation” warrants a finding of non-textual infringement. In either event, the claims themselves and the prior art erect a foreseeability bar that circumscribes the protective function of non-textual infringement. Thus, foreseeability sets an objective standard for assessing when to apply the doctrine of equivalents.

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A foreseeability bar thus places a premium on claim drafting and enhances the notice function of claims. To restate, if one of ordinary skill in the relevant art would reasonably anticipate ways to evade the literal claim language, the patent applicant has an obligation to cast its claims to provide notice of that coverage. In other words, the patentee has an obligation to draft claims that capture all reasonably foreseeable ways to practice the invention. The doctrine of equivalents would not rescue a claim drafter who does not provide such notice. Foreseeability thus places a premium on notice while reserving a limited role for the protective function of the doctrine of equivalents.

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Foreseeability relegates non-textual infringement to its appropriate exceptional place in patent policy. The doctrine of equivalents should not rescue claim drafters who fail
to give accurate notice of an invention’s scope in the claims.

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Implicit in the protective function of the doctrine of equivalents is the notion that the patentees could not have protected themselves with reasonable care and foresight. Enforcing this … [foreseeability] principle more aggressively will help achieve a better balance between the notice function of claims and the protective function of non-textual infringement.21

Is there any reason why this reason why this test should not be adopted both in the United States and in the rest of the world as the appropriate test for non-textual infringement?

B The Unforeseeable Equivalent Rule of Festo

Taking a cue from the concurring opinion in Johnson & Johnston, the Supreme Court in Festo adopted the unforeseeable equivalent rule as the basis for overcoming the estoppel presumption. The Supreme Court recognized that usually a “patentee’s decision to narrow his claims through amendment should be presumed to be a general disclaimer of the territory between the original claim and the amended claim.”22 However, even if a patentee narrows a claim, he may rebut the presumption by showing that “at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent.”23 Specifically, the Supreme Court states that the patentee can rebut the presumption that prosecution history estoppel bars a finding of equivalence if:

The equivalent may have been unforeseeable at the time of the application;

22. Festo, 122 S. Ct. at 1842.
23. Id.
the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question; or there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question.  

One clear and unambiguous “equivalent [that] may have been unforeseeable at the time of the application” is an equivalent based on an after-arising technology. The Supreme Court in Festo, however, did not explain the meaning of the phrase “a tangential relation to the equivalent in question.” It also did not explain when “there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question.”

C Federal Circuit’s Clarifications of the Unforeseeable Equivalent Rule of Festo

The Festo case on remand from the United States Supreme Court was again heard en banc by the Federal Circuit. As explained above, the Supreme Court in Festo spelled out three circumstances in which the presumption of prosecution history estoppel could be rebutted. The Federal Circuit focused on how the rebuttal was to be proved in these three circumstances.

First, the Federal Circuit in Festo IX held that the rebuttal of the presumption is a question of law to be determined by the court, not by a jury, and that the specific factors to be considered in rebutting the presumption are best

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24. Id. The Supreme Court in Festo referred to unforeseeability both at the “time of the amendment” and at the “time of the application.” The Federal Circuit clarified “that the time when the narrowing amendment was made, and not when the application was filed, is the relevant time for evaluating unforeseeability, for that is when the patentee presumptively surrendered the subject matter in question and it is at that time that foreseeability is relevant.” Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 344 F.3d 1359, 1365 (footnote 2; internal citations omitted) (Fed Cir. 2003) (en banc) (“Festo IX”).

25. Id.

26. Id.

27. Id.

28. Festo IX, 344 F.3d at 1359.
developed on a case-by-case basis. The Federal Circuit clarified:

Usually, if the alleged equivalent represents later-developed technology (e.g., transistors in relation to vacuum tubes, or Velcro (R) in relation to fasteners) or technology that was not known in the relevant art, then it would not have been foreseeable. In contrast, old technology, while not always foreseeable, would more likely have been foreseeable. Indeed, if the alleged equivalent were known in the prior art in the field of the invention, it certainly should have been foreseeable at the time of the amendment. By its very nature, objective unforeseeability depends on underlying factual issues relating to, for example, the state of the art and the understanding of a hypothetical person of ordinary skill in the art at the time of the amendment. Therefore, in determining whether an alleged equivalent would have been unforeseeable, a district court may hear expert testimony and consider other extrinsic evidence relating to the relevant factual inquiries.

Regarding the “tangential relation” criterion, the Federal Circuit in Festo IX held that “this criterion asks whether the reason for the narrowing amendment was peripheral, or not directly relevant, to the alleged equivalent.” Subsequently the court defined “tangential” as “merely touching or slightly connected” or “only superficially relevant; divergent,” and stated that “[a]lthough we cannot anticipate the instances of mere tangentialness that may arise, we can say that an amendment made to avoid prior art that contains the equivalent in question is not tangential; it is central to allowance of the claim.” The determination of whether an amendment was “merely tangential” is to be made without the introduction of additional evidence (except where necessary to interpret

29. Id. at 1367-69.
30. Id. at 1369 (citation omitted).
31. Id. at 1369.
32. Id. (citing 2 THE NEW SHORTER OXFORD ENGLISH DICTIONARY 3215-16 (1993) for definitions of “tangential”).
the prosecution history record) and should focus on the patentee’s reason as objectively discernible from the prosecution history.33

Finally, on the “some other reason” criterion, the court in Festo IX described the category as “vague” and thus “must be a narrow one” with the following clarifications:

This category, while vague, must be a narrow one; it is available in order not to totally foreclose a patentee from relying on reasons, other than unforeseeability and tangentialness, to show that it did not surrender the alleged equivalent. Thus, the third criterion may be satisfied when there was some reason, such as the shortcomings of language, why the patentee was prevented from describing the alleged equivalent when it narrowed the claim.34

Thus, the only one bright-line rule of Festo IX is that if the equivalent represents after-arising technology it would not have been foreseeable. Category three would include Graver Tank as it clearly involved a claimed equivalent and so there was no decision to not claim the equivalent that needed explaining. Tangential is essentially meaningless in the context of the doctrine of equivalents as it describes something well-known in geometry, but otherwise it is devoid of content.35

D Analysis

1 The Correctness of the Unforeseeable Equivalents Rule:

33. Id. at 1369-70.
34. Id. at 1370.
35 The Federal Circuit decided for the first time on the issue of “a tangential relation” to the equivalent in question in Insituform Technologies Inc. v. Cat Contracting Inc., No. 99-1584, 00-1005, slip op. (Fed. Cir. October 4, 2004) stating that “the amendment limiting the literal scope of claim 1 to a single cup process bears ‘only a tangential relation,’ if that, ‘to the equivalent in question,’ a process using multiple cups.”
In creating the “unforeseeable”\textsuperscript{36} equivalents rule, \textit{Festo} may disrupt settled expectations of the inventing community as to what is equivalent. Yet, this rule is correct because it appropriately covers equivalents based on after-arising technology, but it does not rescue a claim drafter after drafting poor claims that do not capture all reasonably foreseeable ways to practice the invention which has been the prime use of the doctrine of equivalents in modern case law all over the world.

2 The Unforeseeable Equivalents Rule Should Apply Even Without a “Narrowing” Amendment\textsuperscript{37}

Even though \textit{Festo IX} did not clearly state so, it is important to note that the determination of unforeseeable equivalents under \textit{Festo} is strictly speaking a three-prong test:

\begin{itemize}
  \item[i)] Whether there is a narrowing amendment\textsuperscript{36}?
  \item[ii)] Whether the accused product or process incorporates an element that is based on after-arising technology?\textsuperscript{38}
  \item[iii)] Whether this element is equivalent to a claimed element in the context of the invention?
\end{itemize}

The first prong of the three-prong test could result in inequitable results,\textsuperscript{38} and is not even required for the

\textsuperscript{36} \textit{Festo}, 122 S. Ct. at 1842.

\textsuperscript{37} Prosecution history estoppel arises under \textit{Festo} “when an amendment is made to secure the patent [and] . . . the amendment narrows the patent’s scope.” \textit{Festo}, 122 S. Ct. at 1840 (emphasis added).

\textsuperscript{38} In \textit{Deering}, the Federal Circuit held that it is a narrowing amendment when rejected broader independent claim 1 is canceled in favor of allowed narrower dependent claim 3, which recited a Zero Position Limitation. Deering Precision Instruments, L.L.C., v. Vector Distribution Systems, Inc., 347 F.3d 1314 (Fed. Cir. 2003). The application filed with the United States Patent and Trademark Office (“PTO”) that matured as Deering’s United States Patent No. 4,774,428 (“the ‘428 patent”) initially contained ten claims, including independent claim 1. \textit{Id.} at 1318. Original claim 3, dependent on claim 1, included the Zero Position Limitation. \textit{Id.} at 1319. After review of the application, the PTO rejected claim 1 as being obvious over two United States patents. The PTO objected to claim 3, but indicated that it would be allowable if rewritten in independent form. In response, Deering submitted new claim 11, which was original claim 3 rewritten in independent form. \textit{Id.} Claim 11 issued as claim 1 of the ‘428 patent. \textit{Id.} The Federal Circuit held that the territory between canceled claim 1 and the other claims were rebuttably presumed to have been surrendered by Deering. Furthermore, the Federal Circuit held that “this presumption applies to all claims
determination of unforeseeable equivalents. “Narrowing” or lack thereof was to establish an exception (no surrender) to an exception (prosecution history estoppel) to an exception (doctrine of equivalents) to a conclusion of no literal infringement. This point was explicitly recognized in concurring opinion in *Festo IX* which states, “[f]or a third (or perhaps a fourth) time, this court revisits some exceptions to an exception to an exception to the standard rule of infringement.”

The opinion continues:

> At this point the Supreme Court has only applied foreseeability to identify the scope of surrendered subject matter for an estoppel. But applying the foreseeability principle directly to bar foreseeable equivalents outside an amendment and estoppel context is very consistent with the Supreme Court's holding. This principle in operation promises to preserve drafting expectations while honoring the notice function of claims.

There is no role for prosecution history estoppel, except being limited to patentee's explicit and “unequivocal surrender,” when applying an objective test such as the unforeseeable equivalents rule for the application of the

containing the Zero Position Limitation, regardless of whether the claim was, or was not, amended during prosecution.” *Id.* at 1326 (emphasis added).

Let us assume that Deering had filed a different application (“second application”), instead of the application that matured as the ‘428 patent, on the same filing date, containing the same subject matter of the same inventor with the same drawings, the same written description, but different original claims, and the second application was examined by the same examiner. Assume that claim 1 of the second application was the same as claim 1 of the ‘428 patent, and that it was allowed in the first Action of the PTO. In this situation, for example, should the territory between a hypothetical claim without the Zero Position Limitation and allowed claim 1 of the patent maturing from the second application be rebuttably presumed to have been surrendered by Deering? Strictly speaking, claim 1 of the second application was not narrowed; therefore, the *Festo* presumption should not apply. Yet in both cases, what was already in the public domain remains the same, and allowed claim 1 and the specification of the patent maturing from the second application and the ‘428 patent are the same. Yet, the rights to exclude “equivalents” of what is claimed could drastically differ.

39. *Festo IX*, 344 F.3d at 1374.
40. *Id.* at 1377.
Ipsa facto, there is no need to decide as to whether there is a “narrowing” amendment for the application of the unforeseeable equivalents rule.

Thus, the requirement that there should be a “narrowing” amendment for the unforeseeable equivalents rule to apply is redundant and should be removed. In the alternative, “narrowing” amendment should be construed broadly in the context of a hypothetical claim. The only function of prosecution history estoppel should be whether the burden is on the patentee to prove unforeseeability in accordance with the Festo presumption or whether the burden of proof is on the alleged infringer to show that the accused equivalent product or process was foreseeable by the patentee and hence cannot be captured by the doctrine of equivalents.

3 Proposed Modified Tripartite Test:

Whether the accused product or process incorporates an element that is based on after-arising technology is a question of fact that could be ascertained by persons skilled in the art based on historical facts with the burden of proof on the patentee or the alleged infringer depending on whether the Festo presumption applies. The more difficult question is to ascertain whether this element is equivalent to a claimed element in the context of the invention.

The current “function/way/result” tripartite test is a test for determining equivalency applying an element-by-element analysis. However, one of the authors has argued that there are two weaknesses in its implementation.42

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41. In the en banc decision, Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 234 F.3d 558 (Fed. Cir. 2000) (en banc), re’o’d & remanded, 535 U.S. 722 (2002), on remand, 304 F.3d 1289 (Fed. Cir. 2002), the Federal Circuit confirmed that, in determining infringement under the doctrine of equivalents, a court “may need to consider whether statements made during prosecution give rise to argument-based estoppel. In Pharmacia & Upjohn Co. v. Mylan Pharmaceuticals, Inc., 170 F.3d 1373 (Fed. Cir. 1999), the Federal Circuit held that a patent attorney’s statement characterizing the invention during prosecution represented an “unequivocal surrender” precluding application of the doctrine of equivalents even though the statement was made in a context that suggested it had a limited purpose of comparing one form of the prior art.

The first weakness is that no quantitative method has been applied to determine if the accused product or process has substantially the same result and function as the claimed product or process. To address the first weakness, a quantitative method called the “t-test” has been proposed.43

The second weakness is that the “way” prong, which represents the “order” (i.e., the interrelationship in time space, dimensions, etc.) of the elements as explained by one of the authors,44 is in many cases the most contentious issue for the determination of infringement under the doctrine of equivalents.45 This problem is caused by the lack of any scientific test that proves that one order of one set of elements is substantially the same from another order of a different set of elements. One can determine whether the order of the elements in the accused product or process is the same or different from the order of the elements in the claimed product or process. However, it is difficult, if not impossible, to prove that two orders are substantially the same when they are not the same. One way to prove that two orders are substantially the same is by showing that the results of the two orders are substantially the same. Even if the results of the two orders are similar, the determination of whether the two orders are substantially the same still remains a question of fact that would be decided by the jury.

Thus, when at least one element is the product of an after-arising technology only the “function” and “result” prongs of the tripartite test should be applied in determining equivalency under the doctrine of equivalents.46 Thus in order to minimize inconsistencies, the “way” prong should not be applied to any element of an accused product or process in which at least one element is the product of an after-arising technology. An element that is the product of an after-arising technology

43. Id. at 548-52.
44. Id. at 537.
45. See Adelman & Francione, supra note 10, at 687–88 (“In Pennwalt, as in most equivalents cases, there was no dispute that the accused device performed substantially the same overall function or work and achieved substantially the same overall result. In most cases, the issue is almost invariably whether the accused device performs the overall function in substantially the same way as the claimed invention.”) (citations omitted).
46. See Raj S. Davé, supra note 42, at 540.
and adapted for use in a product or process would likely result in a different “order,” particularly spatial arrangement, among the elements of the product or process. Arguably, a potential infringer of a claimed product or process could circumvent infringement under the doctrine of equivalents by replacing an element in an accused product or process with an element that is the product of an after-arising technology.

The transition from vacuum tubes to transistors is an example of after-arising technology. While this is a perfect example of after-arising technology that the doctrine of equivalents is supposed to accommodate, careful analysis reveals that the facts regarding vacuum tubes and transistors will indicate no equivalency when considered in the current function/way/result tripartite test. The “way” anodes and cathodes work and are spatially arranged in vacuum tubes is totally different from the “way” collectors and emitters work and are spatially arranged in transistors. However, the function and the result obtained by a transistor are substantially the same as those of a vacuum tube. The proposed modified tripartite test would have however recognized the transistor as an after-arising equivalent of a vacuum tube; under the current tripartite test, it would have been difficult to establish equivalence in “way.”

The less stringent modified tripartite test, examining only function and result for accused products or processes incorporating after-arising technology, is consistent with the concurring opinion in Festo VII, wherein he suggested that the doctrine of equivalents should play a special role in extending a patent claim’s literal scope to after-arising technology based on foreseeability. A patent claim draftsperson cannot reasonably be expected to have drafted a claim literally covering the unanticipated equivalent.

The modified tripartite test to account for unforeseeable equivalents should read as follows: the doctrine of equivalents may be invoked against an accused product or process if it performs substantially the same function in substantially the same or in an

unforeseeable way to obtain substantially the same result. If the accused product or process does not encompass an element from later-developed technology, then the phrase “in substantially the same way” from Graver Tank be interpreted as “in the same way.” This modification is justified because one can determine if the elements of two sets have the same or different “orders,” but it is difficult to establish if the elements of two sets have “substantially the same orders.”

E Post Festo Decisions

In the six years since the Supreme Court’s 2002 decision in Festo, the Federal Circuit has issued several opinions further clarifying unforeseeability. In these opinions, the Federal Circuit explained that (1) infringement under the doctrine of equivalents of a second species is not estopped when the specification provides a narrow definition of the first species and it was unforeseeable that the second species would have the desired properties (2) a new matter rejection is not germane to unforeseeability and (3) determination of

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49. See Raj S. Davé, supra note 42, at 543; see also Hughes Aircraft Co. v. U.S., 140 F.3d 1470, 1475 (Fed. Cir. 1998). According to the Federal Circuit in Hughes:

   [A]s a result of an advance in technology, . . . the synchronism in the accused device is coordinated by the computer instead of by real-time execution of the command from the ground. As recognized in Hughes V111 [Hughes Aircraft Co. v. U.S., 717 F.2d 1351 (Fed. Cir. 1983)], the difference between [the] operation[s] . . . [of the accused and claimed devices makes] no change in the function performed, or in the basic manner of operation, or in the result obtained. The court in Hughes V111 correctly performed an analysis of the function, way, and result of the individual elements in the accused devices and concluded that these elements equivalently met the claim limitations at issue. Id. (internal quotations and citations omitted). It took 15 years for the Federal Circuit to confirm the decision of Hughes V111 because of the indeterminacy in applying the “way” prong to an accused device or process incorporating after-arising technology. The proposed modified tripartite test would have allowed the court to arrive at the same outcome on equivalency without the prolonged 15 years of litigation.


51 Abraxis Bioscience, Inc. v. Mayne Pharma (USA), 467 F.3d 1370 (Fed. Cir. 2006).

unforeseeability does no require application of the function/way/result or insubstantial differences test. In Abraxis, the Federal Circuit found that the equivalent was unforeseeable and affirmed the District Court’s finding of infringement under the doctrine of equivalents. The dispute in Abraxis concerned the interpretation of “edetate.” In arguing against infringement under the doctrine of equivalents, the defendant argued that that it was impermissible for the meaning of edetate to extend to calcium trisodium DTPA by equivalence because the patentees chose to narrowly claim their invention. The Federal Circuit held that the narrow definition of edentate as defined in the specification prevented a finding of literal infringement. The court, however, found that the inventors did not clearly disavow other polyaminocarboxylates, including DTPA, by claiming edetate. Indeed, citing the district court, the Federal Circuit noted that “the antimicrobial activity of calcium trisodium DTPA was unforeseeable during prosecution.” The court concluded, “[t]hus, a person of ordinary skill in the art reading the patent would not conclude that by claiming ‘edetate,’ the patentees surrendered or waived coverage of all polyaminocarboxylates, including DTPA, as an equivalent, particularly in light of the unforeseeability of calcium trisodium DTPA as an equivalent. In Glaxo, the Federal Circuit affirmed the district court’s finding of no infringement either literally or under the doctrine of equivalents. During prosecution, Glaxo limited its sustained time release feature to HPMC to overcome an enablement rejection under 35 U.S.C. § 112. In arguing for infringement under the doctrine of equivalents for HPC, Glaxo argued that because it could not have added HPC to its claims at the time of amendment without drawing a new matter rejection, it sufficiently rebutted the Festo presumption of foreseeability. As the Court explained, however, a new matter rejection is not germane to unforeseeability. The new matter doctrine merely prevents an applicant from adding new subject matter to the claims unless the

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54 467 F.3d at 1371.
55 Id. at 1381-82.
specification shows that the inventor had support for the addition at the time of the original filing. Unforeseeability, however, is only available for after-arising technology, not instances in which the applicant could not properly claim a known equivalent because it had purposely left the known substitute out of its disclosure at the time of filing.

On remand from Festo X, patentee Festo argued to the district court that it was not foreseeable at the time it had amended its claims that the equivalents in question could perform the same function as the Festo device. Festo made this argument even though it had successfully argued in the doctrine of equivalents trial that the equivalents in fact performed the same function. In Festo XII, the Federal Circuit clarified that the foreseeability test does not require the application of the function/way/result or insubstantial differences test. That is, an alternative is foreseeable if it is disclosed in the pertinent prior art in the field of the invention. The court further explained that an equivalent that is foreseeable as an alternative to the broader claimed feature does not become unforeseeable simply because the claimed feature was narrowed.

F Conclusion

In Festo IX, the court explains:

Upon reflection, foreseeability will continue to emerge as the unifying principle that justifies the doctrine of equivalents even beyond the confines of rebutting estoppel presumptions. Because the foreseeability principle incorporates a realistic vision of what the applicant intended to achieve by claim drafting and amendments, this principle pledges to uphold, rather than disrupt, drafting expectations. The foreseeability principle has the virtue of placing the judicial enforcer at the table of the patent drafter at the time of claiming or amending. From that vantage point and with knowledge of the prior art, the judge (guided by experts) can deduce something close to the bounds that a careful drafter would have drawn to define the invention.
Under the foreseeability principle, the doctrine of equivalents will not encompass any accessible prior art because this subject matter could have been included in the claims. On the other hand, any after-arising technology or later developments or advances would not fall within the scope of what the drafter should have foreseen and claimed. After all, a skilled patent drafter is a legal technician, not an inventor.\footnote{\textit{Festo} IX, 344 F.3d at 1377.}

As the doctrinal shift occurs in the determination of equivalency applying the foreseeability principle, the courts would soon realize that there is no role for prosecution history estoppel, except for allocating the burden of proof. However, if the accused product or process contains an element that is the product of after-arising technology, then as one of us has argued the determination of whether this element is equivalent to a claimed element in the context of the invention could be ascertained by applying the modified tripartite test, focusing only on function and result — and eliminating analysis of way — should be applied instead of the conventional tripartite test. The foreseeability principle coupled with the modified tripartite test represents the foundation for a change in the definition of equivalency under the doctrine of equivalents, particularly for an accused product or process having an element that is the product of an after-arising technology. Is there any reason why this should not be the world’s standard?
III UK POSITION

A Introduction

To begin with, it bears noting that the word ‘equivalents’ is little used in the UK these days, and instances where it was successfully invoked were not common. Terrell\(^{57}\) opined in 1971 that ‘in more recent years most attempts to establish infringement in reliance on the doctrine of “substance” have failed’, giving ten examples (starting from 1924!) and four counter-examples. The latest edition of the same book\(^{58}\) does not have the word ‘equivalents’ in its index at all, either free-standing or under ‘Infringement’. The CIPA Guide\(^{59}\) mentions the word under ‘Interpretation’, which gives a flavour of the UK approach. Judicial pronouncements are scarcely more encouraging. In Amgen vs TKT, a recent House of Lords decision,\(^{60}\) Lord Hoffman was openly sceptical of this doctrine, owing to which ‘American patent litigants pay dearly for results which are no more just or predictable than could be achieved by simply reading the claims.’\(^{61}\)

It has been observed that ‘the difficulty about bringing “equivalents” into the conception of infringement arises, because neither Article 69 of the European Patent Convention (EPC) nor the Protocol make any allowance for any such doctrine.’\(^{62}\) So it is not something that is spoken about much in court and the term seems to have dropped out of legal discourse concerning patent infringement. The reason for this is not difficult to find. The United Kingdom law of infringement took a fresh

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\(^{60}\) Kirin-Amgen Inc v Transkaryotic Therapies Inc (No 2) [2004] UKHL 46; (2004) 148 SJLB 1249 (HL) [10] (hereafter ‘Amgen’).

\(^{61}\) Amgen ibid [44]. Lord Hoffman delivered the judgment, with which all the other Law Lords concurred.

\(^{62}\) Beloit v Valmet [1995] RPC 705, Jacob J, but see below on EPC 2000.
turn in 1980 with the decision of the House of Lords in the *Catnic* case\(^63\) in which, for the first time, an attempt was made to formulate an approach to be applied in all cases. This formulation has more or less survived the changes effected by the Patents Act 1977 and the ever-closer regard that one pays to the law as it is developing in other jurisdictions. A general historical discussion of the question may be interesting, but it is not to the point. This paper proposes, therefore, to return to first principles. What does an English jurist mean when he speaks about equivalents? Why do they matter? Is there a principled approach that can be taken to the problems that their existence is said to cause?

**B DRAFTING DIFFICULTIES**

A discussion of equivalents should start with the difficulties confronted by the draftsman of a specification, particularly where the rule is first to file rather than first to invent. Speed (coupled with secrecy) is everything. Once the invention is made, it is of the greatest importance to file an application as soon as possible. A patent attorney is confronted with an invention. He must discuss it with the inventor. He must rely on his own knowledge of the technology, and the guidance he receives from the inventor and others to draft a document that must, if it is to form the basis of a valid claim to priority, contain an enabling disclosure of the invention\(^64\). Appropriate claim categories must be decided on: and all this must be done in the knowledge that subsequent amendment during prosecution will never be allowed to add subject-matter, and, if it happens, the patent will be lost. It will not merely lose priority date, because no amendment will be permissible to remove the objectionable matter. At the same time, the patent attorney will wish to secure as wide protection as possible having regard to the state of the art, because that is his basic function. So the burden on the draftsman is a heavy one.

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\(^63\) *Catnic Components Limited & anor v Hill & Smith Limited* [1982] RPC 183.

\(^64\) Sections 14 (making of application) especially sub-s 14(3) (adequacy of disclosure), 15 (Date of filing application) and 5 (priority date) Patents Act 1977. Compare Articles 78 (Requirements of the European patent application), 80 (date of filing), 83 (disclosure of the invention) and 88 (Claiming priority) EPC.
The task of the draftsman will thus be to draft claims as wide as possible having regard to the state of the art, but at the same time to disclose the features of the invention with differing degrees of generality to provide, if necessary, stages in the inevitable narrowing of the claims during prosecution. The result will be dictated by one consideration above all else: how wide is it possible to go having regard to the state of the art. In this process, it is hardly surprising that draftsmen will use words of degree, and perhaps for fear of the examiner, will fail fully to generalise features of the invention as widely as the state of the art may justify. Of course, they may just be bad at their job.

C  Summary of the English Approach

So far as the UK is concerned, the law on ‘equivalents’ is that set out in section 125 of the Patents Act 1977. Section 125 in turn is based on Article 69 of the EPC (European Patent Convention).

Article 69 EPC has two parts: a substantive part, and a ‘Protocol’ (agreement) on its interpretation. The substantive part states that ‘The extent of the protection conferred by a patent or a European patent application shall be determined by the terms of the claims. Nevertheless, the description and drawings shall be used to interpret the claims.’ The Protocol then goes on to elaborate on this by stating thus:

Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these
extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.

As mentioned earlier, section 125 of the 1977 Act incorporates the same principles and states that:

(1) for the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent shall be determined accordingly.

…

‘(3) The Protocol on the Interpretation of Article 69 of the European Patent Contention (which Article contains a provision corresponding to subsection (1) above shall, as for the time being in force, apply for the purposes of subsection (1) above as it applies for the purposes of that Article.’

This is not quite the whole story (note the words ‘for the time being in force…’) because the EPC is being revised and the new convention (‘EPC 2000’) has been ratified by nearly everybody. It will enter into force in 2006-7, and it divides the Protocol into two parts.

Article 1 which is the first part reproduces the existing Protocol requirement. Article 2 interestingly titled “Equivalents” states that

For the purpose of determining the extent of protection conferred by a European patent, due account shall be taken of any element which is equivalent to an element specified in the claims.’

Obviously there is no change of substance in Article 1 of the new Protocol. The fascinating question is whether Article 2 adds anything at all. None of the terms are
defined (‘due account’, ‘element’, ‘equivalent’, ‘specified’)
and for the future it may be worrying that there is no
central authority on interpretation. This is an issue for
another paper altogether. What is interesting however is
that this is the first time that the word ‘equivalent’ has
found its way into an international agreement, which the
UK is obliged to transpose into national law.

There is authority of the House of Lords that the modern
English approach to the interpretation of claims and
infringement satisfies the requirements of the existing
Protocol.65 Like many documents of its kind, the Protocol
does not so much set out a legal test as describe the result
to be achieved, although the Court of Appeal has
impliedly indicated the contrary.66 “The starting point is
the speech of Lord Diplock in Catnic v Hill & Smith67. In
summary, the right approach to interpretation is to read
the patent specification through the eyes of the person
skilled in the art and, in cases in which the alleged
infringement represents a variant upon the words of the
claim narrowly construed, to give the claim a purposive
construction, with a view to determining whether the
feature or features appearing in the alleged infringement
represent variants on the strict meaning of the words
used, the variants having no effect upon the way the
invention worked and that fact being obvious to the
skilled man at the date of the patent.

My Lords, a patent specification is a
unilateral statement by the patentee, in
words of his own choosing, addressed
to those likely to have a practical interest
in the subject matter of his invention
(i.e. “skilled in the art”) by which he
informs them what he claims to be the
essential features of the new product or
process for which the letters patent
grant him a monopoly. It is those novel
features only that he claims to be
essential that constitute the so-called
“pith and marrow” of the claim. A
patent specification should be given a

65 ‘The Catnic principle of construction is therefore in my opinion precisely in
accordance with the Protocol’. See Amgen n 5 [48].
66 Pharmacia v Merck [2002] RPC 775.
purposive construction rather than a purely literal one derived from applying to it the kind of meticulous verbal analysis in which lawyers are too often tempted by their training to indulge. The question in each case is: whether persons with practical knowledge and experience of the kind of work in which the invention was intended to be used, would understand that strict compliance with a particular descriptive word or phrase appearing in a claim was intended by the patentee to be an essential requirement of the invention so that any variant would fall outside the monopoly claimed, even though it could have no material effect upon the way the invention worked.

Where it is not obvious, in the light of then-existing knowledge, the reader is entitled to assume that the patentee thought at the time of the specification that he had good reason for limiting his monopoly so strictly and had intended to do so, even though subsequent work by him or others in the field of the invention might show the limitation to have been unnecessary. It is to be answered in the negative only when it would be apparent to any reader skilled in the art that a particular descriptive word or phrase used in a claim cannot have been intended by a patentee, who was also skilled in the art, to exclude minor variants which, to the knowledge of both him and the readers to whom the patent was addressed, could have no material effect upon the way in which the invention worked.

…Put in a nutshell the question to be answered is: Would the specification make it obvious to a builder familiar with ordinary building operations that the description of a lintel in the form of a weight-bearing box girder of which the back plate was referred to as
“extending vertically” from one of the two horizontal plates to join the other, could not have been intended to exclude lintels in which the back plate although not positioned at precisely 90° to both horizontal plates was close enough to 90° to make no material difference to the way the lintel worked when used in building operations? No plausible reason has been advanced why any rational patentee should want to place so narrow a limitation on his invention. On the contrary, to do so would render his monopoly for practical purposes worthless, since any imitator could avoid it and take all the benefit of the invention by the simple expedient of positioning the back plate a degree or two from the exact vertical.

This suffers from being written in a case concerned with an adjective (‘descriptive word or phrase’) for a ‘thing’, as opposed to the ‘thing’ itself. In formulating his three tests in *Improver v Remington*⁶⁸, which have been approved by the Court of Appeal and provide the approach to construction of claims which is habitually adopted, Hoffmann J restated Lord Diplock’s approach as a sequence of three questions to be asked whenever the alleged infringement fell outside the “primary, literal or a contextual meaning” of the word or phrase in question:

1. Does the variant have a material effect upon the way the invention works? If yes, the variant is outside the claim. If no—

2. Would this (i.e. that the variant had no material effect) have been obvious at the date of publication of the patent to a reader skilled in the art? If no, the variant is outside the claim. If yes—

3. Would the reader skilled in the art nevertheless have understood from the language of the claim that the patentee intended that strict compliance with the primary meaning was an essential

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requirement of the invention? If yes, the variant is outside the claim.

Hoffmann J concentrated on the manner in which the words of narrow meaning are being used in the claim:

On the other hand, a negative answer to the last question would lead to the conclusion that the patentee was intending the word or phrase to have not a literal but a figurative meaning (the figure being a form of synecdoche or metonymy) denoting a class of things which included the variant and the literal meaning, the latter being perhaps the most perfect, best-known or striking example of the class.

Thus in Catnic itself the claim of a patent for a lintel of box construction required that the upper plate be supported upon the lower plate by two rigid supports, one in the front and the other "extending vertically" from the one plate to the other at the rear. The defendant’s lintel had a rear support which was inclined 6° or 8° from the vertical. The House of Lords decided that this variation had no material effect upon the load-bearing capacity of the lintel or the way it worked and that this would have been obvious to the skilled builder at the date of publication of the patent. It also decided that the skilled reader would not have understood from the language of the claim that the patentee was insisting upon precisely 90° as an essential requirement of his invention. The conclusion was that "extending vertically" meant "extending with the range of angles which give substantially

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69 A figure by which a more comprehensive term is used for a less comprehensive or vice versa; as whole for part or part for whole, genus for species or species for genus, etc.

70 A figure of speech which consists in substituting for the name of a thing the name of an attribute of it or of something closely related.
the maximum load-bearing capacity and of which 90° is the perfect example.

In the end, therefore, the question is always whether the alleged infringement is covered by the language of the claim. This, I think, is what Lord Diplock meant in *Catnic* when he said that there was no dichotomy between “textual infringement” and infringement of the “pith and marrow” of the patent and why I respectfully think that Fox L.J. put the question with great precision in *Anchor Building Products Ltd. v. Redland Roof Tiles Ltd.* when he said the question was whether the absence of a feature mentioned in the claim was “an immaterial variant which a person skilled in the trade would have regarded as being within the ambit of the language” (My emphasis). It is worth noticing that Lord Diplock’s first two questions, although they cannot sensibly be answered without reference to the patent, do not primarily involve questions of construction: whether the variant would make a material difference to the way the invention worked and whether this would have been obvious to the skilled reader are questions of fact. The answers are used to provide the factual background against which the specification must be construed. It is the third question which raises the question of construction and Lord Diplock’s formulation makes it clear that on this question the answers to the first two questions are not conclusive. Even a purposive construction of the language of the patent may lead to the conclusion that although the variant made no material difference and this would have been obvious at the time, the patentee for some reason was confining his claim to the primary meaning and excluding the variant. If this were not the case, there would be no point in asking the third question at all.
Catnic was a decision on the Patents Act 1949. Section 125 of the Patents Act 1977, which is declared by section 139(7) to be framed to have as nearly as practicable the same effect as Article 69 of the European Patent Convention, says that the invention shall be taken to be that specified in a claim, as interpreted by the description and drawings. Section 125(3) applies to English patents the Protocol on the Interpretation of Article 69 which, if I may paraphrase, says that Article 69 and section 125(1) mean what they say: the scope of the invention must be found in the language of the claims. Extrinsic material such as the description can be used to interpret those claims but cannot provide independent support for a cause of action which the language of the claim, literally or figuratively construed, simply cannot bear. On the other hand, the claims should not be interpreted literally but in a way which “combines a fair protection for the patentee with a reasonable degree of certainty for third parties.

In his formulation of the “nutshell” question, Lord Diplock may be thought to be suggesting that reasons extraneous to the specification are capable of providing the answer to the third question, summarising the considerations by asking, in effect, “what plausible reason could there be for the patentee choosing to limit himself in this way?” Hoffmann LJ identified this question as one of construction of the specification alone in Improver, and returned to this subject in Société Technique de Pulverisation STEP v Emson Europe Limited:\[1993] RPC 513.

The judge [held] that a bore through a solid block forming the bottom of the cylinder, the top of which formed the bottom of the pump chamber, was arguably “conduit means extending upwards within the cylinder to define

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\[1993\] RPC 513.
therewith a pump chamber.” In other words, nothing needed to extend upwards into the pump chamber part of the cylinder at all. [Counsel] did not support this construction and I do not think it is legitimate. The well known principle that patent claims are given a purposive construction does not mean that an integer can be treated as struck out if it does not appear to make any difference to the inventive concept. It may have some other purpose buried in the prior art and even if this is not discernible, the patentee may have had some reason of his own for introducing it.

Hoffmann LJ is talking here about the omission of features of the claim (integers), but it is difficult to see why the principle is not equally applicable to variants upon features which are clearly defined. (This is a different problem from ascertaining the scope of words of degree, such as “thin and flexible”). To ascertain whether a particular term is being used figuratively or literally is a task which cannot be achieved by analysis of many patent specifications, and often tends to be answered by reference to the other Improver questions. The temptation is to approach the question in this way: if the invention works in the same way with the defined feature as with the variant, and there is no obvious reason appearing from the specification why the patentee did not intend to cover the variant, it follows the word or phrase must be being used figuratively.

This approach, which combines a technical assessment of the ‘variant’ and a linguistic analysis of the specification seems to operate reasonably well. It is interesting that it seems to be neither more nor less generous to patentees, but on occasion differently generous. Thus, for example, UK courts decide in favour of patentees where others do not (the Johnson Motor/Mabuchi litigation) and vice versa (the Epilady litigation). The discipline involved in concentrating on the words, and asking in every case what the function of a word in a claim is in context is, however, very important. It enables the word ‘fixed’ in this phrase “driven continuously through complete revolutions in synchronism in opposite directions about spaced parallel fixed axes generally transverse of the direction of movement of the bag material” to encompass
a movement in which the axes reciprocated towards and away from each other. The purpose of the word ‘fixed’ was to distinguish the prior art, in which the axes moved substantially in space during operation\textsuperscript{72}. So too the word ‘closed’: the alleged infringement permitted some leakage, but was held to be closed, because it was closed in the relevant sense\textsuperscript{73}.

D How Does it Work?

In any case, the problem must be approached in stages. The ordinary rules of construction, which apply to a patent like any other document, require words in a claim to be given their ordinary meaning, or at least the ordinary meaning that is most appropriate to the context.

Consider the following hypothetical example. The invention (a mechanical invention) consists of a widget with two parts, which we shall call the base and the top. Claim 1 calls for a “widget in which the top is secured to the base by a screw perpendicular to the plane of the base”. The three alleged infringements have (1) two components substantially identical to the two components described by the patentee secured by a perpendicular rivet, (2) two components substantially identical to those described by the patentee secured by welding and (3) two components substantially identical to those described by the patentee secured together by a screw at an angle of 60° to the vertical.

Now consider the first variant i.e. the perpendicular rivet. If the evidence was that in the art in question, ‘screw’ was used to denote any form of fastening (synecdoche), or it is clear from the specification that it is being used in this way, then the perpendicular rivet infringes. We do not need to consider ‘equivalents’ at all. On the other hand, if the evidence is that the art does not use the word in any particular sense and the specification does not suggest a particular sense, we have a variant (rivet for screw) and must ask the Improver questions. Normally, a number of possibilities will present themselves. Is detachability important? If it is, the alleged infringement may not work ‘in the same way’ as that claimed, and the patentee fails at the first hurdle. But if the specification says nothing about

\textsuperscript{72} Taylor v Ishida (Europe) Ltd [2001] EWCA Civ 1092.

detachability, then the first and third *Improver* questions must be answered in his favour. There is nothing in the second, and a finding of infringement follows.

The example of the non-perpendicular screw, example (3), can be dealt with in the same way. Does the specification suggest that angle matters? The analysis is very similar to example (1). The example of the weld, (2) is slightly more interesting. If the *Improver* questions are applied mechanically, plainly a weld is a variant on a screw. Does it make any difference to the way the invention works? Well, if all the specification is interested in is fastening, it makes no difference. If the specification is interested in detachability, it may make a difference. Thus the question is approached in precisely the same way.

Now consider another kind of claim, where all the features are precise, the best example being a chemical claim where a general formula is set out, moieties being identified as $R_1$, $R_2$ and so forth, the $R$'s being said to be taken from a list of specified groups. The alleged infringement manages to have the general qualities described by the specification for the compounds of claim 1, but has managed to find a working $R$ that is not in any of the lists, and is not converted into any of the specified $R$'s in use.

The chemical claim example above, as also any case involving ‘after arising technology’ is not answered by the *Catnic*/*Improver* approach in a satisfactory way. For precisely this reason, Lord Hoffman cautioned in *Amgen* that the ‘Protocol questions’ were ‘only guidelines’ and were ‘more useful in some cases than in others.’ He notes in pertinent part (at paragraphs 81 and 84):

> The argument over whether the claim can include the new technology is linked to a dispute over the meaning of the second Protocol question. When one asks whether it would

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74 Claims like this can involve questions of degree, as where ‘lower’ or ‘higher’ members of series are identified, but that does not matter for this discussion.

75 Conversion makes things a lot easier: see *Beecham v Bristol (betacillin)* [1978] RPC 153.

76 *Amgen* [52].
have been obvious to the person skilled in the art that the variant worked in the same way as the invention, does one assume that it works? Otherwise, in the case of a technology which was unknown at the priority date, the person skilled in the art would probably say that it was by no means obvious that it would work in the same way because it was not obvious that it would work at all.…. 

So perhaps a better answer to the dispute over the second Protocol question is that new technology is another situation in which the Protocol questions may be unhelpful. On the other hand, if the claim can properly be construed in a way which is sufficiently general to include the new technology, the Protocol questions tend to answer themselves.

It is interesting to see how principles of construction were applied in Amgen. Of the 31 claims in the patent, only three were treated as relevant. These claims (1, 19 and 26) are briefly summarized as under:

Claim 1: A DNA sequence for use in securing the expression of EPO in a host cell, such sequence selected from tables in the patent or related sequences;
Claim 19: EPO which is the product of the expression of an exogenous DNA sequence, and which has a higher molecular weight by the ‘SDS-PAGE’ testing method than existing EPO derived from extraction from urine; and
Claim 26: EPO which is the product of the expression in a host cell of a DNA sequence according to claim 1.

It must be noted at this juncture that the issue of infringement of the DNA sequence itself (claim 1) never

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arose directly as the alleged infringement was by importation of the EPO product—the subject matter of claims 19 and 26. However it did arise indirectly, since claim 26 referred back to claim 1.

The key issue in determining the scope of the patent was the construction of the term ‘host cell’ as used in claim 26 (and claim 1). In order to resolve this issue, it is important to appreciate the difference underlying the two technologies. While Amgen’s process for the manufacture of EPO relied on an exogenous DNA sequence coding for EPO (which was introduced into the host cell), the TKT method involved gene activation of an endogenous DNA sequence by an exogenous upstream control sequence.

On the evidence, the House of Lords concluded that the skilled person would not regard TKT’s process using an endogenous coding sequence to produce GA-EPO as involving a ‘host cell’, required by claim 1. Consequently, TKT’s GA-EPO was not an EPO falling within claim 26. Similarly, the court held that GA-EPO was not ‘the product of … expression of an exogenous DNA sequence’ within claim 19, and so there was no infringement under this claim as well.

Much in line with its principle of construction outlined earlier, the court made it abundantly clear that this is where the analysis should end. The claim had been construed ‘purposively’, and on the facts there was no infringement. It specifically disapproved of any further attempt to apply the Protocol questions over and above that construction.

There is also a brilliant discussion by Laddie J in Merck & Co Inc v Generics UK Ltd of the way in which Improver works in a case in which it is impossible for the skilled person to know whether or not the invention works in the same way, as that called for by the claim. This will happen when the infringer has ventured into country unexplored by the patentee, or where the patentee has on

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78 Amgen (HL) [53].
79 Amgen (HL) (n 187) [58], [80].
80 ibid [58].
81 ibid [70].
a properly objective reading of the specification, decided to leave that country un-monopolised. The insight of this judgment is that the final sentence of the Protocol imposes a requirement to give the patentee fair protection: but the fairness of that protection is to be assessed objectively by reference to the specification, not subjectively to give the patentee what he might have claimed ‘had he been better advised, or bolder’.

E Conclusion

How does one go about determining appropriate claim scope? It would be presumptuous, and probably wrong, to suggest that the UK has the right answer to this problem. Perhaps there is no right answer at all. Eccentricity is one thing, but differences on issues where reasonable tribunals can differ is entirely another. The notorious cases (like *Epilady*) are cases where individual judges in the same jurisdiction might differ. Can one complain when judges in different jurisdictions differ?
IV GERMAN POSITION*

A INTRODUCTION

The scope of patent protection in Europe is determined in large part by Art. 69 of the European Patent Convention (EPC) for all contracting states. Unfortunately, this Article is not understood in the same way all across Europe. For this reason, instead of a "final" European doctrine, this paper can only present you a German view on this. 84

B BASIC PRINCIPLES OF CLAIM CONSTRUCTION IN GERMAN LAW

The statutory provisions on the interpretation of patent claims and the determination of patent scope are laconic. Art. 69 (1) EPC only defines the scope of protection conferred by a European patent as being determined by the terms of the claims, and allows the description and drawings to be used to interpret these claims. This basic law is supplemented by the Protocol on the Interpretation of Art. 69 which states:

Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description

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* Peter Meier-Beck Dr. iur., Judge at the Bundesgerichtshof, Karlsruhe, Germany, Honorarprofessor at the Heinrich-Heine-Universität, Düsseldorf, Germany.

83 All member states of the European Union, as well as a few more European states, particularly Switzerland.

84 Section 14 of the German Patent Law (PatG) corresponds almost literally to Art. 69 (1) EPC.
and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.

The Munich Revision Act of November 29th 2000 uses the text of the old Protocol to create Article 1 of the new Protocol and adds a new Article 2. It states that: “[F]or the purpose of determining the extent of protection conferred by the European patent, due account shall be taken of any element which is equivalent to an element specified in the claims.”

Since the Protocol on the Interpretation is part of the EPC, “equivalents” is becoming a legal terminology for the first time. But what are equivalents to elements mentioned in the claims? This question is answered neither by the old nor by the revised version of the Protocol, which as usual leaves that to the case law.

The basis for the determination of the scope of protection is the interpretation of the patent claim. Before answering the question of whether a patent merits a scope of protection beyond its wording, there is the question of how this wording of the patent claim is to be understood.

For this understanding, three basic principles are important:

1. Firstly: The understanding of a person skilled in the art addressed by the patent is decisive. The terms used in the patent claim are to be interpreted in view of the understanding of a person skilled in the art, i.e. a person who is active in the technical field of the invention.

85 Art. 164 (1) EPC.

86 According to the draft proposal, which has not been passed by the revision conference, Art. 2 (2) should define equivalents as follows: "A means shall generally be considered as being equivalent if it is obvious to a person skilled in the art that using such means achieves substantially the same result as that achieved through the means specified in the claim."

2. Secondly: That person skilled in the art will consider the technical function of the individual feature of the patent claim as particularly important, when trying to understand the terms used in the patent claim. This is called "function-aimed interpretation" or "purposive construction". But when taking this approach, one has to keep in mind, that the understanding of a physically defined feature must not be reduced to its function. Otherwise, there is the danger that the difference between determining the meaning of the wording of the patent claim and the determination of the scope of protection becomes unclear by incorporating equivalents identical in function into the meaning of the wording of the claim.

3. Thirdly: The person skilled in the art will not look at isolated terms and features of the patent claim, but will rather try to understand their meaning in the context of the entire claim, whereby using the description again to understand the claim as a whole. This is generally referred to as "context-aimed interpretation". The meaning of a term determined in such a way does not necessarily have to correspond with the general meaning of this term in that field of art. Rather, as the Bundesgerichtshof puts it: “The patent is its own dictionary.”

Interpreting the patent claim according to these basic principles is referred to generally in case law as "determination of the meaning of the wording"

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("Wortsinn") or "determination of the technical meaning" of the patent claim.

This level of examination is of profound importance for patent infringement proceedings: if the contested embodiment incorporates any aspect of the claim, properly construed, then the patent is infringed. In this case, much like the position in the UK discussed above, there is no need to think about equivalents.

C PROTECTION OF "EQUIVALENTS" UNDER GERMAN LAW

How is the infringement suit to be decided, if the contested embodiment does not correspond to the wording of the patent claim? In Germany and other countries of continental Europe, there is and has been a near consensus, that, in this case, patent infringement is not necessarily excluded, but that the scope of protection extends beyond the mere wordings of the claim. How is this scope of protection to be determined?

That is, no doubt, one of the central questions in patent law. Where is the border to be drawn between that area, that is to be reserved for the patentee for the protection of her inventive achievement, and the neighbouring area, which every competitor can use to compete with the patentee? This issue is closely connected with a second question: how can this borderline be drawn so that it is visible enough—i.e. how can the scope of patent protection be defined, so that legal certainty is ensured? Those are exactly the two goals enshrined in the Protocol on the Interpretation of Article 69 EPC: appropriate protection for the patentee on the one hand, and sufficient legal certainty for third parties on the other.

In terms of competition law, defining this border means distinguishing two areas: the “open” area in which the complete or partial imitation of products or product concepts is a legitimate means of competition, and the “closed” area in which competitors are forced to use substitutes rather than copies. A focus on this

95 See decision of the Bundesgerichtshof, 2004 GRUR 966 – Standard-Spundfäß.
competition-controlling function would help one appreciate the importance of laying down a clearly discernable borderline. Unfortunately, an optimal discernability of such borderline does not easily correspond to the optimum balance between patent protection and freedom of competition. If the criterion of recognizability is treated as absolute, then it is very hard to grant reasonable scope to the patent and to draw this line appropriately. The scope of protection would, in such a case, be reduced to the literal wording of the patent claim, thereby permitting easy circumvention by a third party. When drafting a patent claim, the drafters’ imagination is usually not sufficient to think about all possible cases, in which a third person may circumvent the literal wording of a feature and still appropriate the core aspects of the invention.

For this reason, the scope of protection conferred by a patent is to be extended to variants or ‘equivalents’. Accordingly, and corresponding to its nature as part of the Protocol on the Interpretation of Article 69 EPC, Article 2 of the revised Protocol only states what can now already be derived from Art. 69 (1) of the EPC. However, Article 69 does not say this explicitly. It does not say how the scope of protection is to be determined, but only suggests a reference point for doing so i.e. by the patent claims. According to the principles developed by the Bundesgerichtshof, the patent claims form not only the starting point, but also the decisive basis for determining the extent of protection: this extent must align with the patent claims.96

The fact that incorporating equivalents into the scope of protection would detract from legal certainty does not mean that the goal of an easily recognizable borderline should be abandoned altogether. On the contrary, it is even more important to adjust the criteria of the determination of the scope of protection to this goal and to examine if the borders of exclusive patent rights can be made as clearly visible as possible.

The most pragmatic instrument of choice here is the cognitive faculties of a person skilled in the art, who is, on the basis of his knowledge and skill in the art, analysing the patent claim and using the description and the

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96 See 106 BGHZ 84, 1989 GRUR 205 – Schwermetallocidationskatalysator.
drawings to interpret the claim. The scope of the patent is determined by this person’s conclusions. It extends to any ‘variant’ that is made obvious by the claim to the person skilled in the art. On the one hand, this has the effect that the scope of the patent is proportionate to all subject matter that can be done or carried out by the person skilled in the art, on the basis of the protected inventive achievement, without being inventive himself. On the other hand, this extent of protection is (almost) becoming predictable by focusing on subject-matter, which is recognized by a person skilled in the art, as being part of the protection conferred by the patent.

This needs to be explained in more detail. But before doing that, one "obvious" objection has to be addressed: if a variant included in the scope of patent protection is obvious to a person skilled in the art, then why can the applicant not be expected to explicitly incorporate it into the patent claim? Should he not realize and include what is obvious? This question is understandable, but it fails to recognize that the average person skilled in the art is as “artificial” as the situation, in which he is brought into by us, when we need his advice. When revoking or invalidating a patent, because the person skilled in the art would have combined two ‘state of the art’ documents, we are generally not disturbed by the fact that no existing person skilled in the art has ever really done this – except the inventor herself. And we are not to be disturbed by this, because otherwise, everything new would have to be regarded as involving an inventive step. It is no different as far as the obvious variants are concerned, which would have been found by the person skilled in the art, even if the applicant had not thought of them in any way.

In short, the scope of the patent does extend to those variants, which are made obvious to a person skilled in the art by the patent claim. The scope of the doctrine of equivalents under German law is now conveniently split up into 4 questions, as discussed below.

D THE FOUR QUESTIONS

Schneidmesser I ("Cutting Blade I"), a fundamental German case on the doctrine of equivalents, divided the examination of the scope of protection into a series of questions, thereby referring back to the English model.

of ‘purposive construction’ under "Catnic" and later elucidated by J Hoffmann in what came to be commonly called the "Improver"-questions.

1. The first question is: Does the modified embodiment solve the problem underlying the invention by means which have objectively the same technical effect?

This question resembles the first Improver-question, but it is not identical to it. Neither does it ask about how the invention "works" or the "function – way – result" test; rather, it only asks about the result of this effort. But this result has to be identical. A merely similar effect is not sufficient.

There is the obvious objection, that this question could be subjected to concerns raised by LJ Robin Jacob with regard to the first Improver-question, in that the requirement by Art. 69 of the EPC that the interpretation be in the context of the patent claim is not met. But this is not the case. As the Bundesgerichtshof has pointed out, a claim-oriented approach is necessary to decide whether the modified means have the same effect. Only such ‘variants’ can be said to have the same technical effect, that produce results that a person skilled in the art understands to be so produced from the claims by every single feature and by the mutual connection of all features of the claim. Determining the technical effect means determining those effects that the person skilled in the art understands to be the result of the technical teaching of the claim. For this reason, the first question and the ‘technical matter’ that it seeks to assess are not divorced from the patent claim. The objective technical correspondence is only relevant, in that it shows up as a correspondence of all effects a person skilled in the art understands to be the effects of the inventive technical teaching.

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99 Improver Corporation v. Remington Consumer Products Ltd (1990 RPC 181; hence the name "Improver" questions).
100 Does the variant have a material effect upon the way the invention works?
If the answer to the first question is "no", the contested embodiment is outside the scope of the patent. If yes, we move on to the second question:

2. *Was the person skilled in the art enabled by his specialist knowledge on the priority date to find the modified means as having the same effect?*

This question is all about excluding those cases, in which an inventive step was necessary to find the modified means as having the same effect.

If that is the case, i.e. if the means having the same effect were not obvious to the person skilled in the art, they are outside the scope of the patent. Because what the person skilled in the art is not able to find and to do based on the patent and helped by her knowledge in the art, is not to be granted to the patentee. Else, the fundamental bargain underlying most patent regimes is violated—i.e. that a patent is an exclusive right granted for a limited period in exchange for certain technical teaching made available by the patentee to the public, by publication of the patent.

If either questions 1 or 2 are answered in the negative, there is no infringement by equivalents. However, if both are answered in the affirmative, we still have to ask a third question before finding for infringement. The format for this question is given by the Bundesgerichtshof in the decision "Schneidmesser I", as explained below.

3. *While answering question 2, are the considerations that the person skilled in the art applies drawn from the technical teaching of the patent claim (so that the person skilled in the art took the modified embodiment into account as being an equivalent solution)?*

Why is this third question necessary? Has everything necessary not been examined already, if the first two questions can be answered with a "yes"? That is not the case, for the following reasons: The first "Schneidmesser"-question pertains only to an objectively identical ‘technical effect’ i.e. a correspondence in the result that the invention aims at. But this correspondence and the fact that the person skilled in the art was able to recognize it without being inventive are not sufficient to bring the
modified embodiment within the scope of protection. If this was only about including all variants that a person skilled in the art would have been able to do with the teaching of the patent, then the second question alone would be sufficient. But there is more at stake here: This is not only about what the person skilled in the art would have been able to do on the priority date knowing the patent, but about what he would have been able to do and would have done on the basis of the patent (of the patent claim). Again, one has to keep in mind that the exclusive patent right correlates to the invention's technical teaching made available by virtue of the patent being published. That is why the third question is about whether the considerations, which the person skilled in the art has to make, are sufficiently close to the technical meaning of the patent claim, i.e. whether they are drawn from the patent claim's teaching to the person skilled in the art. The technical teaching of the patent claim has to be the decisive basis for the consideration of the person skilled in the art, so that he recognizes the variant as an equivalent alternative to an embodiment which carries out the wording (in context) of the patent claim.

This perspective offered by the third question is reflected, in some part, in the first English "Improver"-question, when asking about the way the invention works. But it is not the same. It is rather a question of whether the essential considerations needed by a person skilled in the art to find the variant, are sufficiently close to the patent claim to show an equivalent alternative. In the end, both questions depend on judicial interpretation. However, it appears that posing these three questions has certain advantages: on the one hand, the correspondence in the technical effect of the invention is not subjected to relativization any more. On the other hand, the standard for deciding, whether a modified means attaining the desired technical effect are within the scope of protection, relies specifically on ‘matter’ that the person skilled in the art is able to get out of the patent claim. And according to the law (Art. 69 EPC), it is the patent claim which determines the scope of the patent.

4. Is the modified embodiment anticipated or made obvious by the state of the art?

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This question, which is known as the "Formstein"-objection in German case law, is necessary to prevent a scope of protection (after the previous three questions have been answered in the affirmative) that is inadequately broad in comparison to the state of the art, since it encompasses an embodiment, which – however rarely it may be the case – lacks novelty or at least was obvious to a person skilled in the art. It is only the direct subject-matter of the patent application that is examined for patentability during the grant procedure. The Patent Office does not determine what, having regard to the state of the art, the adequate scope of protection for the subject-matter ought to be. Consequently, such determination has to be made at the stage of infringement proceedings.

It is pertinent to note that unlike US law, file history estoppel has no role for the determination of the scope of the patent. The main reason for this is given in the decision "Kunststoffrohrteil", which states that Article 69 EPC does not mention the file history as a means of interpretation. However, this may not be the only reason. As mentioned in the "Kunststoffrohrteil" itself, there is no practical need to consider events that took place during the grant procedure. Either an equivalent solution is not patentable in view of the state of the art—in which case the "Formstein"-objection prevents the patentee being given protection for it. Or, during the grant procedure, the patentee has assumed erroneously or created the impression that an equivalent solution would not be patentable. In that case, this is irrelevant, because the grant procedure is only for the purpose of determining the subject matter of the patent. The scope of the patent, on the contrary, is to be determined during infringement proceedings. Therefore, any (faulty) views harboured by the patentee or mentioned by him during the grant procedure are without meaning.

E CONCLUSION

The above discussion can be summarised as below:

104 According to the decision of the Bundesgerichtshof 98 BGHZ 12, 1986 GRUR 803, 18 IIC 795 (1987) – Formstein (Molded Curbstone), in which this objection was allowed for the first time.

The main basis for the determination of the scope of patent protection is the patent claim and an understanding by a person skilled in the art of the technical teaching embodied in such claim. For this purpose, a patent claim has to be interpreted in conjunction with both the description of the invention and the drawings. In doing so, the basic principles of function-aimed interpretation of the terms used in the patent claim, as well as a context-based interpretation are to be followed. A contested embodiment, which falls within the meaning of the claim so construed, infringes the patent literally.

A patent can also be infringed if the contested embodiment does not fall within the “literal” scope of the patent claim. This extension in the scope of the patent is to bring about an adequate level of protection of the inventive achievement in a way that also ensures the highest possible level of legal certainty. This optimal balance is achieved by protecting only those variants that the patent claim has made obvious to a person skilled in the art, on the priority date. That is the case, if the following questions 1 to 3 are answered in the affirmative and, in addition, question 4 is answered in the negative:

1. *Does the modified embodiment solve the problem underlying the invention by means which have objectively the same technical effect?*

2. *Was the person skilled in the art enabled by her specialist knowledge on the priority date to find that the modified means would have the same effect?*

3. *While answering question 2, are the considerations that the person skilled in the art applies oriented to the technical teaching of the patent claim (so that the person skilled in the art took the modified embodiment into account as being an equivalent solution)?*

4. *Is the modified embodiment anticipated or made obvious by the state of the art?*
V JAPANESE POSITION*

A Introduction:

It was only in 1998 that the doctrine of equivalents came to be first accepted under Japanese law via the famous Supreme Court decision in THK Co vs Tsubakimoto Seiko Co. (commonly referred to as the Ball Spline decision).\(^{106}\) Prior to this, although major academic theories supported this doctrine, judicial pronouncements were not in favor of this doctrine.\(^{107}\)

Patent litigation in Japan has changed dramatically since the Ball Spline decision. Most patentees now invoke this doctrine in patent litigation, based on the five requirements laid down by Ball Spline.

B Five Requirements by Ball Spline

There will be a finding of infringement only when the following five conditions are fulfilled:

1 Essential Part:

An accused product or process deploys a variant that corresponds with a “non essential element” (the part [element] of the claim that is not considered to be ‘essential’ to the invention). In other words, if the variant used in the infringing device or process corresponds with an “essential element” of a claim, it does not infringe the claim in question, either literally or under the doctrine of equivalents.

2 Interchangeability:

The object, the function and the effect of the invention can be achieved, even if there is a replacement of the

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claimed elements of the invention with elements of the allegedly infringing equivalent.

3 Ease of Interchangeability:

The above interchange can be easily conceived of by a person of ordinary skill in the art at the time of manufacture of the allegedly infringing device or other exploitation by the accused infringer.

4 Not Obvious from Prior Art:

The accused device is not part of prior art or ‘obvious’ from such prior art to a person skilled in the art, on the filing date.

5 No Special Circumstances:

There are no special circumstances, such as the fact that the accused device was intentionally excluded from the scope of the claim by the patentee during prosecution.

The requirements (1) ~ (3) are positive ones and the requirements (4) and (5) are negative ones. It is generally thought that the positive requirements are to be proved by the patentee and the negative requirements are to be proved by the accused infringer.

C Reasons for Applying the Doctrine of Equivalents

The Ball Spline decision articulates the reasons for applying the doctrine of equivalents as follows:

1 Industrial Development, Social Justice and Equity:

It is very difficult to draft claims anticipating all possible types of variants that could crop up in the future. If competitors could avoid infringement by interchanging a part of the claim with new elements or technology that become obvious after the filing date, the incentive for invention will decrease. This will in turn affect the broader rationale of patent law in enhancing the development of the industry through the protection and the encouragement of innovation. This result therefore does not accord with social justice and equity.
2 Predictability by Third Parties:

Apart from providing fair protection to the patentee, a carefully circumscribed doctrine of equivalents would ensure that the scope of patent protection extends only to technology that can be predicted easily by a third party.

3 Patentability on the Filing Date:

Such doctrine would also ensure that any variant that was publicly known or obvious in view of prior art to a person of the ordinary skill in the art would not fall within the scope of the claim, because such variants or technologies are part of the public domain and ought to be exclusively reserved by none.

4 Prosecution History Estoppel:

If during prosecution, the patentee agrees that a certain technology or variant is outside the scope of claims or intentionally excludes such variant, prosecution history estoppel would estop the patentee from later claiming such variants as being within the scope of the patent.

CO-RELATING REASONS TO REQUIREMENTS

Were one to co-relate the four reasons discussed above with the 5 requirements laid down by the Supreme Court in the Ball Spline case, one would find the following:

i) Requirement No. 4 (‘Not obvious from prior art’) is based on Reason No. 3 (‘Patentability on the filing date’).

ii) Requirement No. 5 (‘No special circumstances’) is based on Reason No. 4 (Prosecution history estoppel).

These requirements are negative ones. On the contrary, Requirement No’s. 1 and 2 which are positive requirements do not appear to correspond with any of the reasons. Reason No. 1 states that the doctrine of equivalents should be applied in order to protect the patent right, which is no more than a broad reason for the application of the doctrine of equivalents in general. It is therefore not specific with respect to the first requirement Reason No. 2 which stresses the predictability by third parties is again no more than a general reason for the
the doctrine of equivalents in general. Therefore, the Ball Spline decision does not demonstrate any specific reasons for requiring the positive requirements (Requirement No’s 1 and 2).

D Academic Theories

1 Positive Theories:

Despite the fact that the Japanese Patent Act did not have any provision relating to a doctrine of equivalents, major academic theories were in favor of such a doctrine. They were of the view that such a doctrine was part of equity and express statutory provisions were not necessary to validate such a doctrine.\(^{108}\)

Such theories proposed the following requirements for invoking a doctrine of equivalents:

i) Interchangeability

The equivalent element in the accused device achieves the same function and result as the corresponding element of the patented invention.

ii) Ease of interchangeability

Such interchangeability as mentioned above is easily conceived of by a person of ordinary skill in the art.

Some scholars argued that the first requirement, ‘interchangeability’ should be taken to be fulfilled only when the underlying technological idea of the allegedly infringing product is the same as the patented invention—a requirement conveniently labelled as “identity as a technological idea”. They argued that the scope of a patented invention should not be extended to cover a different technological idea, even if the same function and the same result could be achieved.\(^{109}\)

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\(^{108}\) See Hanrei Kaisetu (n 4) page 125.

\(^{109}\) See “Saikousai Hanketu (mugen shudou you boru supurain jikuuke jiken) kara mita 21seiki ni okeru wagakuni no tokkyokenn no kenri kaishaku no doukou [Movement of claim interpretation of Japanese patent right in the 21st century from the viewpoint of the Supreme Court Precedent (Ball Spline decision)] Chizai Kanri vol.48 No.11 Page 1796 by Mr. Takashi Honma. A Japanese attorney, he has had significant experience with patent matters.
In short, they were of the view that the term “interchangeability” included “identity as a technological idea”. For the sake of convenience, this school of thought is referred to as “interchangeability as a broad concept”—to help distinguish it from the other school that insists on “interchangeability as a narrow concept”. This paper will focus on the ‘interchangeability as a broad concept’ school of thought, which, in short requires:

a) Identity as a technological idea
b) Interchangeability
c) Ease of interchangeability

2 Negative Theories:

A few scholars were not in favour of a separate doctrine of equivalents. Their main reason was that the patent act did not have any separate provision that allowed for such a doctrine. Moreover, these scholars argued that in view of the provision that the scope of a patented invention is to be determined in accordance with the claims in the application, there could not be a separate doctrine of equivalents, which broadened the scope beyond the claims.

Some of these scholars admitted the need for such a doctrine but opined that this was best done by new legislation, as opposed to the creation of such a doctrine by the judiciary.

E Lower Court Judgments

1 Judgments Opposing a Doctrine of Equivalents:

Most lower court judgments relied on the views of the above scholars who opined that a separate doctrine of equivalents was beyond the scope of the law, as it then stood.

Although some judges thought it unfair to not apply a doctrine of equivalents in some cases, it must have been difficult for them to do so in the absence of a clear statutory provision or a Supreme Court precedent. In such cases, judges accorded a rather wide interpretation to the claim. Consequently some of these judgments were
criticized as incorrect claim interpretations that went beyond the technical meaning of the claims.

2 Judgments in Favour of a Doctrine of Equivalents:

As opposed to the above mentioned judges above who were reluctant to read in a doctrine of equivalents into Japanese patent law, some judges ventured to do so, despite the absence of a supreme court precedent.

These judges decided that “identity as a technological idea” should be a part of the requirements for invoking the doctrine— a different ‘technological’ idea would mean that the allegedly infringing invention was different from the patented one. One of their reasons for doing so could be that these courts might have thought that stricter requirements built into such a doctrine would make for easier acceptability of their decisions by the Supreme Court. It is quite possible that these lower court judgments might have had some influence on the Supreme Court when it decided the Ball Spline case.

G Scholarly Comments on this Issue

1 Hanrei Kaisetsu by Judge Ryoichi Mimura:

Judge Mimura, the main Supreme Court Researcher for the Ball Spline decision, published his comments later as “Hanrei Kaisetsu.” Although the responsibility of the Supreme Court researcher is similar to law clerks’ of the US Supreme Court, Japanese researchers’ reports are more influential, because Japanese Supreme Court researchers are appointed from among judges who have more than ten years’ experience as a “judge”. It is reasonable to assume that Judge Mimura’s advise to the Supreme Court in the Ball Spline case corresponds with his views in Hanrei Kaisetsu.

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110 See “Boru supurain saikousai hanketsu ga shimeshita kintouron tekiyou youken no (1) to (2) no igi to kongo no kadai ni tuite [The meaning of requirements (1) and (2) of the doctrine of equivalents decided by the Supreme Court Decision in Ball Spline case and future issues]” by Mr. Etsuji Kotani page 16 in “Tokkyo saiban ni okeru kintouron [The doctrine of equivalents in patent litigation]” by Murabayasi, Kotani et al. Mr. Kotani has substantial experience as a Japanese patent attorney.

111 See n 101.
The crux of Judge Mimura’s argument in Hanrei Kaisetsu is as below:

The positive requirements under the Ball Spline decision can be co-related with the requirements spelt out by scholars who were in favour of the doctrine of equivalents (hereafter referred to as ‘positive theory’).

The positive requirement No. 1 “Essential Part” is the same as “Identity as a technological idea” of the positive doctrine. Requirement No. 2 “Interchangeability” and Requirement No. 3 “Ease of interchangeability” are the same as the corresponding requirements of the positive doctrine prior to the Ball Spline decision.112

Judge Mimura goes on to then stress that the doctrine of equivalents is not applied to the ‘essential’ part of the invention even in the United States or Germany.113

2 Judge Yoshiaki Nishida

Judge Nishida is a presiding judge of the Tokyo High Court, with substantial experience in patent cases.

He argues that the reasons (1) and (2) justify the general application of the doctrine of equivalents, but cannot be justify the specific requirements (1) ~ (3). He argues that the definition of “essential part” cannot be found in the Ball Spline decision and cannot even be extrapolated from the Ball Spline decision114.

He explains that there are two ways of interpreting the term “essential part”, as below:

i) Essential Part (Literal Interpretation)

112 See Hanrei Kaisetsu (n 4) 140.
113 See Hanrei Kaisetsu (n 4) above page 130. Judge Mimura states that the doctrine of equivalents cannot be applied to the essential part of the invention even in the US and Germany “as I mention below”. However, he does not go on to discuss this issue “below” or in any of the following sections/chapters of his report.
As the heading suggests, one is to interpret “essential part” literally according to what one skilled in the art would consider as essential parts for the claimed invention based on the prior art and the specification. Thus, one has to decide what part of the claim is essential to the claimed invention.\textsuperscript{115}

ii) Identity as a Technological Idea

The term “essential part” corresponds with the “identity as a technological idea” requirement propounded by the positive theories prior to the \textit{Ball Spline} decision. Under this theory, one need not decide what specific part of the invention is “essential.” Applying the identity as a technological idea requirement, one would consider the technological idea of the claimed invention and consider the features that result in the technological idea of the claimed invention.

3 Judge Ryuichi Shitara:

Judge Shitara is a judge of the Tokyo High Court, who as a court of appeals judge and a district judge, acquired substantial experience in patent cases.

He argues that the three positive requirements of the \textit{Ball Spline} decision are basically the same as the ‘function-way-result’ requirements of the US. He argues that:

\begin{enumerate}[i)]
  \item the US requirement of the ‘function’ and the ‘result’ prong correspond to the Japanese requirements of ‘Interchangeability’ (second requirement) and ‘Ease of interchangeability’ (third requirement); and
  \item the US requirements of the ‘way’ prong corresponds to the ‘Essential Part’ prong in Japan (first requirement)\textsuperscript{116}.
\end{enumerate}

\textsuperscript{115} How does one decide “what part of the claim is essential” under Judge Nishida’s proposal? This question is debatable and difficult for attorneys outside Japan, and maybe in Japan too, to fully understand and grasp.

\textsuperscript{116} See “FESTO saikousai hanketu zengo no beikoku no kintouron narabini beikoku, eikoku, doitsu oyobi wagakuni no kintouron no kokusaiteki hikaku [The American doctrine of equivalents before and after FESTO Supreme Court Decision and the international comparative study of the doctrine of equivalent in US, UK, Germany and Japan]” by Judge Ryuichi Shitara in “Chiteki zaisanken, sono
Much like Judge Mimura, he opines that the US doctrine of equivalents also requires an “essential part” requirement.

4 Judge Makiko Takabe:

Judge Takabe is a presiding judge of the Tokyo District Court. Having been a Supreme Court researcher earlier, she comes with tremendous experience in this area. She agrees with Judge Nishida.117

H Meaning of “Essential Part”

After the Ball Spline decision, the doctrine of equivalents began to be commonly invoked in patent infringement litigation in Japan. Between the Ball Spline decision and August 2002, there were 115 cases in which the doctrine of equivalent was invoked. Of these cases, the doctrine was applied and affirmed only in 9 cases, which translates roughly to a mere 7.8% of the total cases where the doctrine was invoked. In other words, the court rejected the application of this doctrine in 92.2% of the cases.

Underlying most of the rejections was the fact that the variant in question pertained to an ‘essential part’ of the invention. The number of such rejections was 66 i.e. more than 60% of the cases in which the doctrine was applied and not upheld.118 Based on these statistics, it could be argued that the ‘essential element’ requirement is the most important one among the 5 requirements spelt out by the Ball Spline decision.

However, the Ball Spline decision does not lay down any definition of the term “essential”. To glean this meaning, we have to look to other sources.

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118 See “Boru supurain saikousai hanketsu go no kintouron ga ronjirareta hanketu ichiran [Tables of the judgments decided about the doctrine of equivalents after the Ball Spline decision] in Murabayasi & Kotani above page 708.
1 Literal Meaning and Predictability

As stated earlier, Judge Nishida argues that the “essential part” requirement should be interpreted literally and that the essential part in each case should be decided by referring to the prior art and the specification. Judge Nishida correctly points out that the concept of “identity as a technological idea” is too abstract and would lead to legal uncertainty and ought not therefore to form a part of the ‘essential part’ requirement.

However, it is pertinent to note that his recommendations in the Hanrei Kaisetsu have no binding power. Judge Takabe agrees with Judge Nishida on this point as well.

2 Foreign Sources

Judge Mimura and Judge Shitara argue that, much like the Ball Spline decision, the doctrine of equivalents is not applied to an ‘essential part’ of the invention even in the United States or Germany. One could therefore distil the essence of the ‘essential part requirement’ from US/German jurisprudence.

However, Mr. Ken’ichi Hattori, an American patent attorney, argues that “essential part” requirement does not exist in US. He is of the view, and rightly so, that an insistence on an ‘essential part’ requirement tantamounts to an “invention as a whole” doctrine—a doctrine that was rejected by the US Supreme Court when the court propounded the “all elements rule”. The Japanese “essential part” requirement is therefore unique and one cannot therefore draw from foreign sources to help gauge its meaning.

3 Tokyo High Court Decision

119 See Nishida above page 190.
120 See Takabe above.
121 See “Nichi bei kintouron shingai hikaku [Comparative study of infringement by the doctrine of equivalents in Japan and US]” by Ken’ichi Hattori page 73, 83 in Murabayasi & Kotani above. Mr. Hattori has substantial experience both as a US patent attorney as well as a Japanese patent attorney.
122 See Kotani above page 21. He agrees with both Mr. Hattori and me.
The often cited decision to extrapolate the meaning of ‘essential part’ is a decision from the Tokyo High Court: 123

The key aspects of the judgment are extrapolated below:

i) The “essential” part of the patented invention is the characteristic part, which is the core of the technological idea underlying the solution to the technological problem addressed by specific patented invention.

ii) When deciding whether a part of the allegedly infringing device corresponds to the “essential part” of the patented invention, one should not merely look narrowly at the claim, but should take a wider view of the characteristic principle underlying the means to solve the problem, when compared with the prior art and then decide whether the principle of the means of the accused device conforms substantially to an identical principle underlying the patented invention.

Problems with Tokyo High Court Decision

The key problem with the judgment is that the definition suggested by the court is not a clear one and is difficult to understand. Notwithstanding this lack of clarity, a number of lower courts have followed this definition. 124

Moreover, as Mr. Jubin Matsumoto, a prominent litigator from Japan, argues, the court definition appears to have an inbuilt contradiction. 125 The definition is composed of two different parts, as mentioned above. While the former part is akin to an “all elements rule”, the latter part

123 The Judgment decided by the Tokyo High Court on October 26, 2000 (Hanrei-jiho No.1738 Page 97)
124 See Kotani above page 18. See also “Bessatsu jurisuto” above page 152~163.
125 See “Bessatsu jurisuto” above page 159. Mr. Matsumoto commented on a judgment decided by the Osaka High Court on April 19, 2001 (2001 ne 2198). The Osaka High Court’s decision on the ‘essential part’ requirement was similar to the Tokyo High Court’s decision in 2000 mentioned above. Mr. Matsumoto’s criticism of the Osaka High Court decision would apply to the Tokyo High Court decision.
involves considerations similar to “invention as a whole”. If so, these two rules contradict each other.

**Contradiction against Hanrei Kaisetsu:**

As mentioned above, Hanrei Kaisetsu written by Judge Mimura argues that the “Essential Part” requirement is the same as the “Identity as a technological idea” concept propounded by the positive theories prior to the *Ball Spline* decision. If so, the former half of the Tokyo High Court judgment contradicts even the Hanrei Kaisetsu, because the former half says that the essential part of the patented invention is the characteristic part, which is the “core” of the technological idea. This focus on the core appears to stand opposed to the way that one would identify the ‘patented invention as a technological idea’, as a whole.

As Judge Nishida states, there are two ways to define the ‘essential part’ requirement. One is to interpret it literally and the other is to read in the “identity as a technological idea” theory. Underlying the *Ball Spline* decision, as interpreted by Hanrei Kaisetsu, is the “technological idea theory”. But the lower court judgments are a kind of strange combination of both these theories.

**K Disadvantages of the “Essential Part” Requirement**

As mentioned earlier, the main reason underlying the aversion of the Japanese lower courts towards applying the doctrine of equivalents is that the “essential part” requirement is unclear. Had the “essential part” requirement not existed, the doctrine of equivalents could have been applied to many more cases.

There is still considerable doctrinal confusion. The *Ball Spline* decision seems to be based on the “all elements rule.” But the Hanrei Kaisetsu argues that the “essential part” requirement is the same as the “identity as a technological idea” concept, which in turn is substantially similar to the “an invention as a whole” concept. As a result of this theoretical confusion, the lower court decisions are a kind of a strange mixture of the “essential part” doctrine similar to the “all elements rule” on the one hand and the “identity as a technological idea”
doctrine (and thereby the “an invention as a whole”) on the other.

The most serious problem is that the principle of “an invention as a whole” has some adverse consequences. When a certain part of an invention is “essential as a whole” invention, although the part itself is not essential, the doctrine of equivalent cannot be applied, because of the “essential part” requirement.

L PROPOSALS FOR DEFINING “ESSENTIAL PART”

1 Need for defining “essential part”:

Prior to finding an apt definition for the term “essential part”, one has to determine whether the ‘essential part’ requirement is a necessary one at all i.e. can we dispense with it? The Ball Spline decision, which is binding precedent clearly states that the essential part requirement is necessary and till date, there has not been a single judicial decision that has dispensed with the ‘essential part’ requirement. It is extremely difficult to change a precedent in Japan and there does not appear to be any move by the Parliament to amend the law. Therefore, the “essential part” requirement is here to stay and one is forced to attempt a definition for the same.

2 Judge Nishida’s Proposal:

Judge Nishida argues that the “essential part” should be decided with reference to the prior art and the specification. He argues that the essential part of the invention is that part which has the specific effect of solving the technological problem at hand. Basically, the specific effect should be decided by the technological problem, function, way, result etc.

Judge Nishida’s proposal appears to be a practical one that will help limit the unpredictability associated with the “essential part” requirement. Yet, one fails to understand how one can decide an “essential part” even with reference to the prior art and the specification. If a practical way to decide the “essential part” cannot be

126 To change a precedent, an en banc (Grand Bench) decision of the Supreme Court of Japan is necessary.
found, his theory does not go very far in limiting the unpredictability associated with the essential part requirement.

Moreover, Judge Nishida argues that, when a certain effect is categorized as a ‘specific’ one in the specification, the patentee cannot argue that the element corresponding to such effect is not ‘essential’, even if the effect is in fact not ‘specific.’ His reason for such an argument is the concept of argument based ‘prosecution history estoppel.’ However, prosecution history estoppel should not be applied to this case, as such a concept would appear too strict in such a context and adversely affect the patentee. The effects of a patented invention are not very clear in most specifications, because it is common for one to find that some of the prior art has the same effect or that the effect cited is the effect of no more than a working example. If we place too much emphasis on the effects specified in the specification, it could lead to adversely affect the patentee and not offer fair protection.

3 Author’s Proposal:

Judge Nishida argues that the “essential part” of the invention should be decided by reference to the prior art and the specification. Since Judge Nishida’s proposal comes with its fair share of problems, as highlighted above, this paper proposes that the ‘essential part’ be based on the claim and prior art.

Illustratively, if the patented invention is composed of elements A + B and the element “A” is part of prior art, it can be concluded that it is the addition of element B that makes the invention patentable. Therefore, element B should be taken to be the “essential part” of the invention.

Consider a change in the above example where both A and B are part of prior art. The invention in this case is a combination of A and B, a combination that was not obvious to a skilled person. Here, neither A nor B are “essential parts” of the invention—rather the “essential part” is the combination. Consequently, the doctrine of equivalents can be applied to both A and B.

The advantage of this proposal is that it is both simple and predictable.
F  Future Movements

As highlighted above, an en banc (Grand Bench) decision of the Supreme Court of Japan is necessary to change the Ball Spline decision which mandates an “essential part” requirement. This is very difficult and the Congress is not likely to act in the near future. The “essential part” requirement is therefore here to stay for sometime.

An optimal way to limit the adverse effects of the “essential part” requirement is to define it as clearly and objectively as possible, so as to provide for more predictability in the application of the doctrine of equivalents. From this viewpoint, the author’s proposal for defining the ‘essential part’ requirement is a robust one.

There are some lower court judgments which mirror the author’s proposal. Although this is not made explicit by them, it is apparent from their application of the “essential part” requirement. It is hoped that future decisions would take the simple definition proposed in this paper into account.
VI WORKING WITH A HYPOTHETICAL

In order to help appreciate the jurisdictional differences in construing claim scope and the doctrine of equivalents, we present below a hypothetical example—albeit with a slight ring of truth to it.

The year is 2005. The time is 11.45 pm. A group of Oxford students are returning after a social event in a rather inebriated state. As they rush to catch the last bus home, one of them trips and falls, as a result of running with shoes that bear high heels, aided in no small part by berry flavoured Vodka coursing through her veins. Needless to say, not only were her fine Italian high heel shoes marred, her ankle took a considerable beating and saw her limping for a good number of days. In a rare moment of chivalry, X, a member of that group comes up with the idea of a slideable heel—which could be slid off anytime a person wished engage in strenuous activities such as running to catch a bus. It bears noting that it was not the lure of monopoly profits that drove X to this wonderful idea—rather, it was thought of endearing himself considerably to his Italian colleague. Nevertheless, as most god fearing people do, X files for and obtains a patent. The shoes are an instant success and just as familiarly breeds contempt, a successful invention breeds copycats. So along came Polly (P) who copies the concept, but does so in an intelligent manner.

We first present the original independent claim of X’s patent application:

A shoe comprising an upper, a sole, a detachable shoe heel and a device that attaches the detachable shoe heel on to a heel portion of the sole.

This claim was rejected by the patent office for lack of enabling disclosure. The patent office’s position was that the specification, while being enabling for screws for attachment of the detachable shoe heel on to a heel portion of the sole, does not reasonably provide enablement for any device capable of attaching the
detachable shoe heel on to a heel portion of the sole. The rejection further stated that the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The specification only teaches how one should attach the detachable shoe heel on to a heel portion of the sole using screws but not with any other device.

In response to this rejection, X changed “a device that attaches” to “screws that attach” that resulted in the allowance of the following claim:

A shoe comprising an upper, a sole, a detachable shoe heel and screws that attach the detachable shoe heel on to a heel portion of the sole.

In short, X’s patent claim was allowed as the specification enables one to attach/detach a heel from the main frame of a shoe (“upper”) by means of a screw i.e. the detachable heel has an inbuilt screw protruding from it, enabling it to be screwed into the heel portion of the upper, which in turn, consists of a hole into which the “screw” portion of heel can be inserted. P’s allegedly infringing product deploys principles of magnetism to achieve the same end, i.e. the “heel” portion in the sole and the upper layer of the detachable heel are made of a superconducting plastic magnet that is a non-metallic magnet made from an organic polymer, such that, when brought together, they stick firmly. In order to ensure that the heel sticks firmly to the main frame of the shoe (“upper”), the magnet used is a fairly strong one, such that the heel cannot be detached by simply pulling it apart manually from the main shoe frame. Rather, in order to detach the heel, a user would have to demagnetize the magnetic portion of the sole with the help of a small switch appended to the shoe. Also, once demagnetized, the magnetic portion in the outer sole rids itself of its rather clingy desire to pick up anything metallic found on the road.

Let us now examine whether P’s shoes are likely to infringe in the US, UK, Germany and Japan, under their respective tests of infringement. The results are presented in a comparative table.
B US position

The key test for determining scope and infringement in the US is whether “each element of the claim is infringed, either literally or equivalently”.\(^{127}\) In terms of determining infringement by an accused device that does not correspond “literally” to the patent claim in question, the position can be summarised in terms of the following questions:

1. Tripartite test: Does the accused device in question “perform substantially the same function in substantially the same way to obtain substantially the same result?”\(^{128}\) This test has to be applied to each element/limitation\(^{129}\) of the patent claim and the corresponding element in the accused device.\(^{130}\) If the answer is no, then there can be no infringement. If yes:

2. Prosecution history estoppel: Does the prosecution history reveal a narrowing of claims?\(^{131}\) If the answer here is ‘no’, a finding of

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\(^{127}\) The Supreme Court in *Festo* squarely adopted the point of view of the Federal Circuit in *Pennwalt* that the doctrine should be applied on an element-by-element basis: “Each element contained in a patent claim is deemed material to defining the scope of the patented invention, and thus the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole.” See Raj S. Davé, *A Mathematical Approach to Claim Elements and the Doctrine of Equivalents*, 16 Harv. J.L & Tech 507, 512 (2003).


\(^{129}\) The courts have unfortunately not defined what an “element” is or what the difference between an element and a “limitation” is. See Davé, *supra* note 42 at 532. For the purposes of this example, the term “element” is used here interchangeably with the term “limitation”.

\(^{130}\) See Davé, *supra* note 42 at 547-8 where he argues that despite arguments to the contrary, *Corning Glass* did not dispense with the need for showing one-to-one correspondence of claim elements and elements of the accused device.

\(^{131}\) Prosecution history estoppel “provides that a patent owner can be estopped from relying upon the doctrine of equivalents when the patent applicant relinquishes coverage of subject matter during the prosecution of the patent, either by amendment or argument.” CAE
infringement is likely. If ‘yes’, there is a presumption of “a general disclaimer of the territory between the original claim and the amended claim.”132 This presumption can be rebutted by the patentee by demonstrating the following:

a. The equivalent in question was unforeseeable at the time of the narrowing amendment.
b. The rationale underlying the narrowing amendment bore no more than a tangential relationship with the equivalent in question i.e. the “reason for the narrowing amendment was peripheral and not directly relevant to the alleged equivalent.”133
c. There is some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question.

Let us apply the above framework to the allowed claim.

**Tripartite test:**

1. It is clear that the element “shoe comprising an upper, a sole, a detachable shoe heel” reads on P’s shoes, which also consists of a detachable heel.

2. The contentious elements in the claim would be “screws” in the limitation “screws that attach the detachable shoe heel on to a heel portion of the sole.” The accused device uses a magnet and does not have “screws,” at least literally. One has to therefore turn to the doctrine of equivalents.

3. Both the screws in X’s shoe and the magnet in P’s shoes perform substantially the same function of attachment of two objects and obtain substantially the same result of attaching the detachable shoe heel on to the heel portion of the sole. However, Screenplates, 224 F.3d at 1319; Pharmacia & Upjohn Co. v. Mylan Pharms., Inc., 170 F.3d 1373, 1376-77 (Fed. Cir. 1999).

132 Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co, 344 F.3d at 1369 (Fed Cir 2003) (en banc) (hereafter “Festo IX”).

133 Id.
do the magnet in P’s shoes perform the function of attachment in substantially the same way as the screws in X’s shoes? To answer this question, the first thing one need to address is to define what the “way” prong refers to in both P’s and X’s shoes. Arguably, the “way” prong refers to mechanism or method of attaching the detachable shoe heel on to the heel portion of the sole. One can then argue that broadly speaking both the magnet and the screws perform the function of attaching the detachable shoe heel on to the heel portion of the sole by a force that holds the detachable shoe heel on to the heel portion of the sole, and therefore the “way” of performing the attachment function in P’s shoes is substantially the same as that in X’s shoes. On the other hand, one can argue that the magnet in P’s shoes and the screws in X’s shoes do not perform the attachment function in substantially the same “way” as the attachment in X’s shoes using screws is by frictional forces while the attachment in P’s shoes using magnets is by magnetic forces.

**Prosecution history estoppel:**

The prosecution history reveals a narrowing of the claim, changing “a device” to “screws” in response to a rejection for lack of enabling disclosure. As there is a presumption of a general disclaimer of the territory between the original claim and the amended claim, we need to check if this presumption can be rebutted. As the reason for the narrowing amendment was not tangential, but directly in response to a rejection for lack of enabling disclosure, and there is no other reason suggesting that X could not reasonably be expected to have described “a device” other than “screws,” the only remaining ground to rebut this presumption is whether the magnetic attachment device of P’s shoes is an unforeseeable equivalent of screws that attach the detachable shoe heel on to a heel portion of the sole.

Now assume that although principles of ‘magnetism’ were well known at the time of the narrowing amendment of the claim in X’s application, there was no magnetic device that could attach the detachable shoe heel on to a heel portion of the sole since the magnetic strength of pre-existing devices would not
be strong enough to keep the detachable heel attached at all times to the heel portion of the sole, i.e. any strong jerks whilst walking were likely to pull apart the detachable heel from the upper. However, after X’s application for a patent, technology advances considerably and a new kind of a superconducting plastic magnet that is a non-metallic magnet made from an organic polymer with superior magnetic power is discovered. Owing to the superconducting plastic magnet’s strength, the user has to demagnetise the magnetic portion of the sole through a tiny switch appended to the shoe. Similarly, in order to re-attach the heel to the upper, the user would have to re-magnetise the magnetic portion with the help of the switch.

In this case, under the Festo ruling, the fact that “a superconducting plastic magnetic that is a non-metallic magnet made from an organic polymer” was after arising technology would mean that X could not have possibly covered P’s variant in his claims. However, X would still need to show that the superconducting plastic magnet in P’s shoes is an “equivalent” to the screws in X’s shoes by the “tripartite test,” i.e. it performs substantially the same function in substantially the same way to achieve substantially the same end. As mentioned earlier, it is arguable that the magnet in P’s shoe operates in substantially the same “way” as the screws in X’s shoe. It is owing to such a difficulty that the authors recommend that particularly in the context of after arising technology, the “way” prong should be done away with.

C UK position

1. Much like the US, in the UK, the element ‘A shoe comprising an upper, a sole, a detachable shoe heel and screws that attach the detachable shoe heel on to a heel portion of the sole’ would be literally infringed by P’s product. The contentious element in the claim would be “screws that attach.”

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For construing this term, the UK courts are likely to adopt the following approach:

a. In construing a patent claim, as opposed to a strict literal interpretation, emphasis is placed upon what the skilled person would have understood a patentee to mean by the language of the claims. The issue of ‘infringement’ is a fairly straightforward assessment of whether the infringing product or process falls within the ‘claim’ scope, thus so purposively ‘construed’. Unlike the US, the UK courts do not recognize a separate doctrine of equivalents, over and above this principle of construction.

1. The key issue is whether term “screws that attach” would include P’s deployment of a new kind of a superconducting plastic magnet that is a non-metallic magnet made from an organic polymer with superior magnetic power in achieving the same end. It seems unlikely that a skilled person would stretch the term “screws that attach” to include such a variant as a skilled person would not have considered a magnet made of plastic to be capable of functioning as screws. An interesting question to ask in the context of an increasing number of cases using experts and expert evidence is whether these experts, now increasingly knowledgeable in legal intricacies would now construe ordinary terms in a “doctrine of equivalents” sense, i.e., since they now know that this doctrine applies across the Atlantic, would this expanded scope of protection affect their interpretation of technical terms?

2. What would happen if this superior ‘magnetic’ technology was not known at the time of the application? There is no rule similar to Johnson and Johnston in the UK. Therefore, the infringement analysis is likely to remain the same.

D German position

The key test for determining scope and infringement in Germany is the same as in the US, namely whether “each feature of the claim is infringed by the accused product”.

135 These principles equally apply to process claims.
either literally or equivalently”. The claim interpretation for infringement, both literal and equivalently, require a purposive construction of the claim’s wording, i.e. a construction that accounts for the function of the features in the context of the technical teaching of the patent. The understanding of the man skilled in the art addressed by the patent is decisive\textsuperscript{136}. A feature is literally infringed if the element of the accused devise falls within the construed meaning of the feature. If a feature is not literally infringed, the accused embodiment does not fall within the scope of protection unless it passes a three pronged equivalence test\textsuperscript{137}:

1. The contentious feature of the claim is “screws that attach” as compared to P’s deployment of a new kind of a superconducting plastic magnet that is a non-metallic magnet made from an organic polymer with superior magnetic power. The answer to the first question of the three-pronged equivalence test is “yes” as a shoe having a superconducting plastic magnet solves the same problem of attaching the detachable shoe heel on to a heel portion of the sole as the screws in the claim.

\textsuperscript{136} Decision of the Bundesgerichtshof, GRUR 1999, 909; 30 IIC 932 (1999); 2001 OJ EPO 259 – Spannschraube (Tension Screw).

\textsuperscript{137} Commonly referred to as the 'Schneidmesser-Test' because it was set out in the decision of the Bundegerichtshof, GRUR 2002, 515, 2003 ENPR 309; 33 IIC 873 (2002) – Schneidmesser I (cutting knife I).

2. The answer to the second question of the three-pronged equivalence test is “no” as the person skilled in the art enabled by his specialist knowledge on the priority date would not have found a magnet made of plastic as having the same effect as that of screws as the new kind of a superconducting plastic magnet that is a non-metallic magnet made from an organic polymer with superior magnetic power was neither invented nor recognized as being possible to be made at the priority date.

E Japanese position

The technical scope of the patented invention is decided based on the claim under Japanese patent law, and the “all elements” rule is applied under the Japanese doctrine of equivalents. All of the elements of the claim should correspond, either literally or equivalently with the accused product or process.

As noted earlier, the Ball Spline decision laid down five requirements for the applying the doctrine of equivalents.

1. Essential part
2. Interchangeability
3. Ease of interchangeability
4. Non-easiness on the filing date
5. No special circumstances

Applying the five requirements above, we get the following results below:

1. A shoe comprising an upper, a sole, a detachable shoe heel

   It is clear that this element is literally read on the equivalent shoe having the new kind of a superconducting plastic magnet that is a non-metallic magnet made from an organic polymer.

2. “screws that attach the detachable shoe heel on to a heel portion of the sole”

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139 See supra.
The element “screws that attach the detachable shoe heel on to a heel portion of the sole” does not literally read on the new kind of a superconducting plastic magnet that is a non-metallic magnet made from an organic polymer.

The analysis in Japan would now proceed as follows:

(1) Are “screws that attach the detachable shoe heel on to a heel portion of the sole” essential part of the claimed shoe? The answer is “yes” as screws are essential part of the claimed shoe for the shoe for the attachment of the detachable shoe heel on to a heel portion of the sole.

(2) Is the superconducting plastic magnet interchangeable with screws? The answer is “yes” as the screws and the superconducting plastic magnet are both used for the attachment of the detachable shoe heel on to a heel portion of the sole.

(3) Is the superconducting plastic magnet easily interchangeable with screws? Arguably, the answer is “yes” as persons skilled in the art would have easily interchanged screws with the superconducting plastic magnet for the attachment of the detachable shoe heel on a heel portion of the sole as it was well-known to attach a device such a hanger to a metal substrate with screws or a magnet.

(4) What would be the non-easiness on the filing date of using the superconducting plastic magnet in lieu of screws? As the new kind of the superconducting plastic magnet that is a non-metallic magnet made from an organic polymer with superior magnetic power was neither invented nor recognized as being possible to be made at the filing date, the non-easiness on the filing date of using the superconducting plastic magnet in lieu of screws would be extremely high. Thus, under the Japanese position, the modified shoe would not be considered to infringe the claim under the doctrine of equivalents.
VII CONCLUSION

The title of this paper queries: ‘The Doctrine Of Equivalents In Various Patent Regimes—Does Anybody Have It Right?’ In answering this questions, it is important to note the differences in approach to determine equivalence in the US, UK, Germany and Japan. Even though the approaches adopted in these countries are clearly different, one can conclude that while there is no single “right” approach and that the outcome in the real world might not be substantially different as exemplified by a hypothetical example in this paper.

The US discussion extrapolates the essence of the doctrine of equivalents as reflected in case law and recommends that:

The foreseeability principle coupled with the modified tripartite test represents the foundation for a change in the definition of equivalency under the doctrine of equivalents, particularly for an accused product or process having an element that is the product of an after-arising technology.

It then ends by asking: “Is there any reason why this should not be the world’s standard?”

Contrast this with the UK discussion, which ends with:

It would be presumptuous, and probably wrong, to suggest that the UK has the right answer to this problem. But I leave it with a final doubt. I am not sure that there is a right answer at all. Eccentricity is one thing, but differences on issues where reasonable tribunals can differ is entirely another. The notorious cases (like Epilady) are cases where individual judges in the same jurisdiction might differ. Can we complain when judges in different jurisdictions differ?

Germany lays down a fairly clear test and appears to combine the best of both worlds—i.e. the purposive construction of the UK and some of the essential principles underlying the doctrine of equivalents in the US.

Japan admits that its “essential part” test may not be optimal—but absent a Supreme Court ruling (over turning this test) or legislative intervention, the best way out would be to find a simple and predictable definition for “essential part.” Such a definition is in fact proposed in this article and the discussion concludes with the hope that a future interpretation of the “essential part” requirement would take this proposed definition into account.

Despite these apparent differences in approach to claim construction and the doctrine of equivalents, it is interesting to ask whether these tests yield similar results. This precisely is the focus of the last chapter, which includes a hypothetical claim and demonstrated that when such claim is construed in accordance with the different tests employed in the different jurisdictions, the results are broadly similar. Although this is merely one example and may not hold good in all cases, it does cause one to reflect on whether these differences in
approach are merely “apparent”—shorn of their outer casting, they are effectively the same in practice?