

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

Nicholas Pumfrey, Martin J. Adelman, Shamnad Basheer, Raj S.  
Davé, Peter Meier-Beck, Yukio Nagasawa, Maximilian Rospatt  
and Martin Sulsky\*

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**ABSTRACT**

*The doctrine of equivalents is arguably one of the most important aspects of patent law. The protection a patent confers is meaningless if its scope is determined to be so narrow that trivial changes to a device bring it out of the bounds of the patent. One of the greatest challenges courts and legislatures therefore face in patent law is to create rules for determining patent scope that maintain the protection a patent is meant to confer while still keeping the patent monopoly within reasonable bounds. Despite the general unity in patent laws among developed countries, the difficulty of this task has led to different results in different jurisdictions. Many jurisdictions have chosen to determine patent scope under a doctrine of equivalents, while others have maintained the position that adequate scope can be found within the meaning of a patent's claim. Even jurisdictions which agree that a doctrine of equivalents should apply differ significantly in its application. This Article provides an examination of four patent jurisdictions—the United States, the United Kingdom, Germany,*

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\* This article is in honor of the Lord Justice Pumfrey, now deceased. The contributors are Nicholas Pumfrey, and the rest listed alphabetically, Martin J. Adelman, Shamnad Basheer, Raj S. Davé, Peter Meier-Beck, Yukio Nagasawa, Maximilian Rospatt and Martin Sulsky. Lord Justice Pumfrey was a U.K. High Court judge (Chancery Division) until he joined the Court of Appeal two months before his untimely death in December 2007; Martin J. Adelman is the Theodore and James Pedas Family Professor of Intellectual Property and Technology Law at George Washington University Law School; Shamnad Basheer is Ministry of HRD Professor in IP Law, National University of Juridical Sciences, Kolkata; Dr. Raj Davé is a Partner at Pillsbury Winthrop Shaw Pittman LLP; Prof. Dr. Peter Meier-Beck is a judge at the Bundesgerichtshof, Karlsruhe, Germany and a Honorary Professor at the Heinrich-Heine-Universität, Düsseldorf; Yukio Nagasawa, former Judge of Tokyo High Court, is a Professor at the University of Tokyo and a Partner at the Haruki & Tokyo-Marunouchi Law Offices, Tokyo; Max v. Rospatt is an Attorney at Law and Partner at rospatt osten pross, Düsseldorf, Germany, and Dr. Martin Sulsky is an Associate at Pillsbury Winthrop Shaw Pittman LLP.

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*and Japan—and their separate answers to the question of patent scope. This Article does not purport to decide which jurisdiction has the right solution, but merely points out that different solutions can be and have been found for the question of equivalents. Although a traditional case of patent infringement under the doctrine of equivalents may find protection under all four jurisdictions, the laws of these countries start to diverge on questions regarding after-arising technology, the essential elements of a patent claim, and equivalents that clearly fall outside the language of a claim. One cannot answer the question, “Does anybody have it right?” without first considering these issues.*

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### I. INTRODUCTION

Most jurists the world over would concede that determining patent scope is one of the most difficult aspects of patent law. 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—in different jurisdictions as it permits a court to find infringement even when the accused device or process is not literally covered by a valid claim of the patent. This Article will consider and compare such differences from the perspective of four key patent jurisdictions: the United States, the United Kingdom, Germany, and Japan.

In this Article, each jurisdiction is tackled separately by experts within that jurisdiction, and then their analysis is woven into one cohesive whole by posing the question: “Does anybody have it right?”

### II. THE UNITED STATES

#### A. Judicial Underpinnings for the Doctrine of Equivalents

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 § 271 shows that it only codifies the statute on literal or textual infringement. The doctrine of equivalents is the result of case law, not statute.

The doctrine of equivalents has its roots in the United States Supreme Court decision in *Winans v. Denmead*.<sup>1</sup> The patent in *Winans* 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*'s railcar without falling within the literal language of *Winans*'s patent.<sup>2</sup> The trial court found no infringement, but a sharply divided Supreme Court found infringement, 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

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<sup>1</sup> 56 U.S. 330 (1853).

<sup>2</sup> See *id.* at 340.

claim every form in which his invention may be copied, unless he manifests an intention to disclaim some of those forms.<sup>3</sup>

After the development of a modern claiming system, the doctrine of equivalents was firmly established in American law by the landmark decision of *Graver Tank & Manufacturing Co. v. Linde Air Products Co.*<sup>4</sup> (*Graver Tank II*). This case guided the United States doctrine of equivalents for almost the entire latter half of the twentieth century. The patent in *Graver Tank II* involved a welding process and claimed a welding flux<sup>5</sup> containing a major proportion of alkaline earth metal silicate.<sup>6</sup> The preferred embodiment disclosed in the patent was a flux that included a mixture of silicate of calcium and silicate of magnesium. The accused flux also used silicate of calcium, but substituted silicate of manganese (a non-alkaline earth metal), for silicate of magnesium. However, the patent specification taught that manganese, the metal used by the infringer, could be substituted for magnesium.

The Court found that, although the accused flux did not infringe the claimed invention literally, it did infringe under the doctrine of equivalents. The Court indicated that “[t]he essence of the doctrine [of equivalents] is that one may not practice a fraud on a patent.”<sup>7</sup> The Court explicitly likened this “essential” notion of “fraud on the patent” to the piracy of the “unscrupulous copyist”—the scoundrel of copyright law.<sup>8</sup> According to the Court, “[o]ne who seeks to pirate an invention, like one who seeks to pirate a copyrighted book or play, may be expected to introduce minor variations to conceal and shelter the piracy,” because “[o]utright and forthright duplication is a dull and very rare type of

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<sup>3</sup> *Id.* at 343.

<sup>4</sup> 339 U.S. 605 (1950); see Martin J. Adelman & Gary L. Francione, *The Doctrine of Equivalents in Patent Law: Questions That Pennwalt Did Not Answer*, 137 U. PA. L. REV. 673, 700-03 (1989).

<sup>5</sup> Welding flux is a blanket of molten metal compounds used to protect freshly deposited molten metal in the welding process, thereby producing sound weld metal. See *Linde Air Prods. Co. v. Graver Tank & Mfg. Co.*, 167 F.2d 531, 532-33 (7th Cir. 1948), *rev'd in part*, 336 U.S. 271 (1949).

<sup>6</sup> The district court found the alkaline earth metal flux claims in question valid and infringed, but found other flux claims and all welding process claims to be invalid for technical reasons. See *Linde Air Prods. Co. v. Graver Tank & Mfg. Co.*, 86 F. Supp. 191, 199-200 (N.D. Ind. 1947). The court of appeals reversed, finding all of the claims in issue valid. *Linde Air Prods.*, 167 F.2d 531. The Supreme Court reversed the appellate court and reinstated the district court's decision. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.* (*Graver Tank I*), 336 U.S. 271 (1949). The Court reheard the case in 1950 in *Graver Tank II*, which concerned infringement of the flux claims.

<sup>7</sup> *Graver Tank II*, 339 U.S. at 608.

<sup>8</sup> See *id.* at 607.

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infringement.”<sup>9</sup> Moreover, the Court suggested that only “insubstantial” changes would be encompassed by the doctrine.<sup>10</sup> Accordingly, the Court affirmed the test for infringement under the doctrine of equivalents: “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.’”<sup>11</sup>

Noting that “[i]t is difficult to conceive of a case more appropriate for application of the doctrine of equivalents,”<sup>12</sup> the Court affirmed the district court’s finding that the accused flux was substantially identical in operation and result. The Court focused specifically on evidence indicating that the prior art disclosed the use of manganese silicate as an ingredient in welding compositions, and that those skilled in the art would have regarded manganese silicate as interchangeable with magnesium silicate.<sup>13</sup>

*Graver Tank II* was at the time and remains today a very unusual case on its facts since the accused flux was both disclosed and more significantly claimed in the patent, but the claims that covered the accused flux were held invalid. Hence the Court in *Graver Tank II* used the doctrine of equivalents only to expand a valid narrow claim to cover the accused flux that the inventor clearly considered to be within his patent claims. These special facts demonstrate that the public was put on notice in very clear terms that the inventor considered the accused flux to be an infringement.

The doctrine of equivalents flourished, with broad application of the function/way/result test, after *Graver Tank II*, although none of the cases involved a patent with a claim covering the product or process alleged to be an equivalent.<sup>14</sup> However,

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<sup>9</sup> *Id.* The Court noted that the doctrine applied both to pioneer, or primary, inventions and to secondary inventions “consisting of a combination of old ingredients which produce new and useful results.” *Id.* at 608. According to the Court, “[w]hat constitutes equivalency must be determined against the context of the patent, the prior art, and the particular circumstances of the case,” and “[e]quivalence . . . is not the prisoner of a formula and is not an absolute to be considered in a vacuum.” *Id.* at 609. Although “[a] finding of equivalence is a determination of fact” and “[p]roof can be made in any form,” the Court stressed that “[a]n important factor is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was.” *Id.*

<sup>10</sup> *See id.* at 610.

<sup>11</sup> *Id.* at 608 (quoting *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929)).

<sup>12</sup> *Graver Tank II*, 339 U.S. at 612.

<sup>13</sup> *Id.*

<sup>14</sup> An extensive discussion of the post-*Graver* equivalence cases is found in Adelman & Francione, *supra* note 4. This article takes the reader to the late 1980s. The authors are still not aware of any case where the alleged equivalent

nearly fifty years later, the Court chose to reconsider the doctrine in *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*<sup>15</sup> In doing so, the Court held that the doctrine still lived, but it indicated that every element of a claim is material and the function/way/result test for equivalents must be applied to each individual element and not to the claim as a whole.<sup>16</sup> In addition, the Court indicated that each element must not be so construed as to “effectively eliminate that element in its entirety.”<sup>17</sup> The Court then reaffirmed the doctrine of prosecution history estoppel as a limitation on the doctrine of equivalents,<sup>18</sup> decided that equivalency should be decided at the time of infringement,<sup>19</sup> and suggested the use of special questions of interrogatories as a means for dealing with black box jury verdicts.<sup>20</sup> The Court did not attempt to provide a theory for why the doctrine exists beyond that found in *Graver Tank II*.

Although the Supreme Court did not set forth a justification for the doctrine of equivalents in *Graver Tank II*, it seems to have adopted the justification provided by Federal Circuit Judge Rader. In a case involving the doctrine of dedication,<sup>21</sup> Judge Rader wrote a lengthy concurring opinion which set forth a theory upon which to base a sound doctrine of equivalents.<sup>22</sup> Judge Rader suggested a simple principle to incorporate both the doctrine’s notice function, ensuring that the definition of an invention can be found in its claims, and its protective function, protecting the inventor from insubstantial variations he could not have thought to include: “[T]he 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.”<sup>23</sup>

### **B. The Unforeseeable Equivalent Rule of *Festo***

Taking a cue from Judge Rader, the Court in *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*<sup>24</sup> essentially adopted his

was covered by an existing patent claim which was subsequently invalidated thereby forcing the patent owner to use a narrower claim plus the doctrine of equivalents for its infringement case.

<sup>15</sup> 520 U.S. 17 (1997).

<sup>16</sup> *Id.* at 29-30.

<sup>17</sup> *Id.*

<sup>18</sup> *Id.* at 32.

<sup>19</sup> *Id.* at 37.

<sup>20</sup> *Id.* at 39.

<sup>21</sup> The doctrine that holds that a disclosed but unclaimed embodiment in the patent cannot be recaptured by the doctrine of equivalents.

<sup>22</sup> *Johnson & Johnston Assocs. Inc. v. R.E. Serv. Co.*, 285 F.3d 1046, 1056-59 (Fed. Cir. 2002) (en banc).

<sup>23</sup> *Id.* at 1056.

<sup>24</sup> 535 U.S. 722 (2002).

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foreseeability approach, but only when the inventor seeks to overcome what otherwise would be a prosecution history estoppel. The Court recognized that usually a “patentee’s decision to narrow his claims through amendment may be presumed to be a general disclaimer of the territory between the original claim and the amended claim.”<sup>25</sup> 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.”<sup>26</sup> Specifically, the Court stated 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; 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.<sup>27</sup>

The Court, however, did not explain the meaning of the phrase “a tangential relation to the equivalent in question.”<sup>28</sup> 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.”<sup>29</sup> As for the latter condition, no subsequent case has found it a basis for overcoming the presumption and nobody in the literature has proposed even a hypothetical situation where it would apply.<sup>30</sup> As for “tangential,” it is totally devoid of linguistic content as applied to patent law instead of geometry or differential calculus. It apparently came out of nowhere (probably the result of a law clerk’s feeble attempt at making a contribution to the law). The

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<sup>25</sup> *Id.* at 725.

<sup>26</sup> *Id.*

<sup>27</sup> *Id.* at 740-41. Afterwards, the Federal Circuit held 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 n.2 (Fed Cir. 2003) (en banc).

<sup>28</sup> *Festo Corp.*, 535 U.S. at 740.

<sup>29</sup> *Id.* at 740-41.

<sup>30</sup> The Federal Circuit has suggested that this 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.” *Festo*, 344 F.3d at 1370.

Federal Circuit has found that an amendment was tangential in only a very few cases.<sup>31</sup>

More importantly, the Court did not explain why this reasonably foreseeable approach to the doctrine of equivalents should only apply to amended claim elements.<sup>32</sup> After all, an applicant normally considers the same legal and factual issues when deciding how to draft her originally filed claims as when deciding whether to amend claims during prosecution. In *Celltech Chiroscience Ltd. v. MedImmune Inc.*,<sup>33</sup> Lord Justice Jacob, one of the world's leading patent jurists, had to decide an infringement question under U.S. patent law. In the course of doing so, he commented on the Court's explanation for its approach to overcoming an estoppel:

Perhaps of most significance in this case, even if file wrapper estoppel did not apply, is the observation that "the patentee . . . may be expected to draft claims encompassing readily known equivalents." Does this apply also to unamended claims? Suppose, for instance, an unamended claim which says "nailed." And suppose screwed, riveted or glued would do just as well. Are those equivalents not covered by the doctrine of equivalents? *Putting it another way is it only unforeseeable equivalents which are now covered by the doctrine?*<sup>34</sup>

Lord Justice Jacob therefore recognized an inherent inconsistency in the doctrine of equivalents in the United States as currently understood. If there is a prosecution history estoppel with respect to a claim element, then the only equivalent permitted for such an element is one that is not reasonably foreseeable, i.e. most often an after-arising equivalent unless somehow the estoppel was tangential. In short, it is unforgiving of patent attorney errors made during the prosecution of the patent if they result in the narrowing of claim elements, but not of patent attorney decisions made during the drafting of the originally filed claims.

The unforeseeable equivalents rule in *Festo* brings about other inconsistencies in United States law as well. The current function/way/result tripartite test is a test for determining equivalency applying an element-by-element analysis. However,

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<sup>31</sup> See the concurring opinion of Judge Rader in *Cross Medical Products, Inc. v. Medtronic Sofamor Danek, Inc.*, 480 F.3d 1335, 1346 (Fed. Cir. 2007) (Rader, J., concurring), which discusses the two cases that have found that the amendment was tangential and explaining why this requirement was unwise.

<sup>32</sup> *Festo Corp.*, 535 U.S. at 740-41.

<sup>33</sup> [2002] EWHC 2167 (Pat.) (Eng.).

<sup>34</sup> *Id.* ¶ 18.

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*Festo* brings out a weakness in this test.<sup>35</sup> The way prong, in many cases the most contentious issue for the determination of infringement under the doctrine of equivalents,<sup>36</sup> represents the “order” (i.e., the interrelationship in time space, dimensions, etc.<sup>37</sup>) of the elements.<sup>38</sup> An element that is the product of an after-arising technology 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.

**C. Conclusion**

In any event, it is clear that in the United States an element subject to a prosecution history estoppel is subject to the reasonably foreseeable limitation whereas an element that is not may be expanded by any known or unknown equivalent. Whether the United States will adopt the reasonably foreseeable approach for all limitations is for the courts in the future to decide. At present there is no reason to believe that the current approach that differentiates limitations based on whether or not they are subject to a prosecution history estoppel will be changed.

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<sup>35</sup> See Raj S. Davé, *A Mathematical Approach to Claim Elements and the Doctrine of Equivalents*, 16 HARV. J.L. & TECH. 507, 540-43 (2003).

<sup>36</sup> See Adelman & Francione, *supra* note 4, 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)).

<sup>37</sup> See Davé, *supra* note 35, at 534.

<sup>38</sup> See *id.* at 537.

### III. THE UNITED KINGDOM<sup>39</sup>

#### A. Introduction

In *Kirin-Amgen v. Hoechst Marion Roussel Ltd.*,<sup>40</sup> the ruling decision of the House of Lords, Lord Hoffmann was openly skeptical of the U.S. doctrine of equivalents remarking that “American patent litigants pay dearly for results which are no more just or predictable than could be achieved by simply reading the claims.” Lord Hoffmann argued that giving claims a “purposive” construction eliminates any need for a doctrine of equivalents. While the late Sir Hugh Laddie argued that Lord Hoffmann misread prior English precedents, even he conceded that current English law does not provide for any protection against “equivalents”.<sup>41</sup>

This chapter examines the “purposive construction” approach under English law and the contours of Article 69 of the European Patent Convention (EPC), with which English law is meant to comply. It finds that under the current English approach where the need to provide adequate notice of patent breadth to the public is balanced against fair protection to the patentee, a claim cannot be read literally, but is to be construed purposively in accordance with the specification and drawings. The law clearly states that in order for a variant or an equivalent to infringe, such variant or equivalent must fall within the language of a claim. In other words, an equivalent that does not fall within the language of a claim, however interpreted, is not caught, despite the fact that such variant may amount to nothing more than an unfair copying of the very essence of the inventive concept.

The chapter then examines the amended language of the EPC2000 (which came into force in 2007) and argues that it is unlikely to change the law governing equivalents in the United Kingdom.

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<sup>39</sup> This chapter was begun by Lord Justice Pumfrey, who unfortunately passed away in December 2007. It was completed by Shamnad Basheer. While great efforts were taken to adhere to the key structure outlined by Justice Pumfrey, the author has, at times, strayed to bring in other issues that deserve discussion, including the contours of Article 69 of the European Patent Convention, and the prospect of changed interpretation in the light of EPC 2000. *See* Convention on the Grant of European Patents (European Patent Convention), art. 69, Oct. 5, 1973, 1065 U.N.T.S. 255, 275-76 [hereinafter EPC], available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ma1.html>. Mr. Basheer wishes to thank Justine Pila and Duncan Curley for their helpful comments on this section.

<sup>40</sup> [2004] UKHL 46, ¶ 44.

<sup>41</sup> Hugh Laddie, *Kirin Amgen—The End of Equivalents in England?*, 40 INTERNATIONAL REVIEW OF INTELLECTUAL PROPERTY AND COMPETITION LAW [IIC] 3, 6 (2009) (F.G.R.).

## B. Drafting Difficulties

A discussion of equivalents should start with the difficulties confronted by the draftsman, 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.<sup>42</sup> Appropriate claim categories must be decided on, and all this must be done in the knowledge that one cannot subsequently amend the patent specification to add subject-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.

The task of the draftsman will thus be to draft claims as wide as possible without bumping into the prior 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 claim having regard to the state of the art. In this drafting process, it is hardly surprising that draftsmen will use words of degree, and perhaps for fear of the examiner, will fail fully to generalize features of the invention as widely as the state of the art may justify. Of course, they may just be bad at their job.

These difficulties indicate that the perfect patent claim will often remain an unattainable ideal. Thus most patent jurisdictions agree that the law ought not to penalize omissions in drafting, particularly when such an omission spurs a competitor to appropriate the essence of an invention through minor variants that may not technically fall within the strict literal wordings of a claim. However, the tests laid down by courts for determining when such variants are likely to fall within the scope of a patent monopoly, despite omissions in drafting are allegedly different. The United Kingdom’s test takes the form of a “purposive” construction approach that is more limited in scope than the corresponding doctrine of equivalents in the United States.

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<sup>42</sup> *Compare* Patents Act, 1977, c. 37, § 5 (priority date), *id.* § 14 (making of application), *id.* § 14(3) (adequacy of disclosure), *and id.* § 15 (date of filing application), *with* European Patent Convention art. 78, Oct. 5, 1973, 13 I.L.M. 268 (requirements of the European patent application), *id.* art. 80 (date of filing), *id.* art. 83 (disclosure of the invention), *and id.* art. 88 (claiming priority).

### C. Summary of the English Approach

There are two versions of the history of the English approach to equivalents. One is that laid out by Lord Hoffmann in *Kirin-Amgen*.<sup>43</sup> The other is described by the late Sir Hugh Laddie.<sup>44</sup> However, both agree that the doctrine of purposive construction articulated by Lord Diplock in the famous *Catnic* case<sup>45</sup> represents the current law.<sup>46</sup> Given that Lord Hoffman's views were expressed in his judicial capacity sitting in the House of Lords, the highest court in the United Kingdom, this view will hold sway insofar current English law in this regard.

In *Amgen*, Lord Hoffman not only endorsed the *Catnic* approach as a correct statement of the English position, but also claimed that it conforms to the EPC mandate on claim interpretation.<sup>47</sup>

#### 1. *Catnic*

In *Catnic*, the invention pertained to a “steel girder” lintel used in the construction of doors and windows. The claim 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.<sup>48</sup> The defendant deployed a lintel with a rear support that was inclined six or eight degrees from vertical.<sup>49</sup> The House of Lords ruled 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.<sup>50</sup> Importantly, it also held that the skilled reader would not have understood the claim to mean that the patentee was insisting upon precisely ninety degrees as an essential requirement of his invention. The court therefore concluded that “extending vertically” meant extending with the range of angles which give substantially the maximum load-bearing capacity and of which ninety degrees is the perfect example”.<sup>51</sup> The court stated:

A patent specification should be given a purposive construction rather than a purely literal one derived

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<sup>43</sup> *Kirin-Amgen*, [2004] UKHL 46, [2005] R.P.C. 9.

<sup>44</sup> See Laddie, *supra* note 41.

<sup>45</sup> *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1982] R.P.C. 183 (H.L.).

<sup>46</sup> See *Kirin-Amgen*, [2004] UKHL 46, ¶¶ 42-45; Laddie, *supra* note 41, at 10-11.

<sup>47</sup> *Kirin-Amgen*, [2004] UKHL 46, ¶ 44.

<sup>48</sup> *Catnic*, [1982] R.P.C. at 240.

<sup>49</sup> *Id.* at 241.

<sup>50</sup> *Id.* at 244.

<sup>51</sup> *Id.* at 244.

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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.<sup>52</sup>

*2. Improver*

In *Improver Corp. v. Remington Consumer Products Ltd.*,<sup>53</sup> Mr. Justice Hoffmann (as he then was) restated Lord Diplock's purposive construction 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 requirement of the invention. If yes, the variant is outside the claim.<sup>54</sup>

*Improver* is one of a series of cases<sup>55</sup> involving infringement of a European patent corresponding to the U.S. '772 patent<sup>56</sup> that covered a motorized depilatory known as the Epilady. It essentially used a coiled spring attached at both ends to a motor.

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<sup>52</sup> *Id.* at 243.

<sup>53</sup> [1990] Fleet Street Reports [F.S.R.] 181 (Pat. Ct.).

<sup>54</sup> *Id.* at 189.

<sup>55</sup> A list of all of the cases may be found in John Gladstone Mills III, *A Transnational Convention for the Acquisition and Enforcement on International Patent Rights*, 88 J. PAT. & TRADEMARK OFF. SOC'Y 958, 960 n.10 (2006).

<sup>56</sup> U.S. Patent No. 4,524,772 (filed July 22, 1983).

The motor drives one end of the spring clockwise and the other end counterclockwise and the rotating curved spring pulls out hair. The Epilady was a great commercial success. The accused device sold under the name Smooth and Silky was the subject of the '375 patent.<sup>57</sup> It essentially substituted a plastic (rubber) tube with grooves for the coiled spring. It was specifically designed to improve on the Epilady design.<sup>58</sup>

A key issue in the application of the *Improver* questions was how one was to determine obviousness for purposes of answering the second question. Mr. Justice Hoffman opined thus:

In my view the question supposes that the skilled man is told of both the invention and the variant and asked whether the variant would obviously work in the same way. An affirmative answer would not be inconsistent with the variant being an inventive step. For example, the choice of some material for the bendy rod which was *a priori* improbable (e.g. on account of its expense) but had been discovered to give some additional advantage (e.g. painless extraction) might be a variant which obviously worked in the same way as the invention and yet be an inventive step. Nor would it matter that the material in question, being improbable, would not have suggested itself to the skilled man as an obvious alternative. Questions such as these may be relevant to the question of construction (Lord

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<sup>57</sup> U.S. Patent No. 4,726,375 (filed Mar. 30, 2987).

<sup>58</sup> The independent claim of the European patent corresponding to the '772 patent reads:

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

*Improver*, [1990] F.S.R. at 185 (quoting language from the patent).

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Diplock’s third question) but not at this stage of the inquiry.<sup>59</sup>

Another important aspect of the case is the court’s treatment of the third question which focuses on the intent of the inventor as evidenced by the patent specification. Therefore, it provided a basis for a court to decide not to expand a claim on the theory that the patentee did not want the claim to be so expanded. That is precisely what Mr. Justice Hoffmann did in *Improver* with respect to question three, where he refused to expand the claim even though the specification indicated that equivalents were included.

Thus interpreted, I do not think that “helical spring” can reasonably be given a wide generic construction and I accept Dr. Laming’s reasons for thinking that a skilled man would not understand it in this sense. This is not a case like *Catnic* in which the angle of the support member can be regarded as an approximation to the vertical. The rubber rod is not an approximation to a helical spring. It is a different thing which can in limited circumstances work in the same way.<sup>60</sup>

### 3. *Amgen*: The End of the *Improver* Questions?

The last *Improver* question asks if the skilled person might, even if the variant works in obviously the same way as the patented invention, still construe the patent claim in a narrow manner such that the variant is excluded from its ambit. One is hard pressed to see why one has to necessarily go through the two earlier *Improver* steps in all cases before asking this critical third question, which amounts to nothing more than asking: how would a skilled person have construed the term? Put another way, in many cases, it is far more economical to go directly to the third question, which in essence is what the *Catnic* purposive construction approach is all about.<sup>61</sup> This logic is evident on the facts of *Improver* itself. Mr. Justice Hoffman ought to have simply asked: would the skilled person have construed the term “helical spring” as used in the patent specification to include a rubber rod? The answer is likely to have been a clear no.

And this is precisely what Lord Hoffman did in *Amgen*, by which time he had been elevated to the House of Lords, the highest

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<sup>59</sup> *Id.* at 192.

<sup>60</sup> *Id.* at 197.

<sup>61</sup> Of course in some cases, it is not possible to “purposely construe” without asking the first two questions

court in the United Kingdom.<sup>62</sup> He strongly cautioned that the *Improver* guidelines were not to be ritualistically applied in every case.<sup>63</sup>

One can see parallels between Lord Hoffman's subsequent approach to the *Improver* guidelines and the U.S. Supreme court's view of the "suggestion motivation teaching" test evolved by the Court of Appeals for the Federal Circuit to determine the obviousness or otherwise of an invention.<sup>64</sup> In both cases, the courts warned against a dogmatic application of the standard or guideline in question, stipulating that while they might help in some cases, other cases could be resolved using the usual tests developed by earlier case law.

In some cases, the first two *Improver* questions may help one construe the claim in accordance with what the skilled person might have thought. But here again, although the variant may not materially impact the manner in which the patented invention works and this is obvious to a person skilled in the art, the said variant must fall within the language of the claim. In other words, the first two questions by themselves, without the third, might bring English law closer to the U.S. position which permits protection against an equivalent that falls outside the language of a claim.

The facts of *Amgen* are as follows. Of the thirty-one claims in the *Amgen* patent,<sup>65</sup> only three were treated as relevant. These claims (1, 19 and 26) can be briefly summarized as follows:

*Claim 1:* A DNA sequence for use in securing the expression of erythropoietin (EPO) in a host cell, such sequence selected from tables in the patent or related sequences,<sup>66</sup>

*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-

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<sup>62</sup> See *Kirin-Amgen v. Hoechst Marion Roussel Ltd.*, [2004] UKHL 46, [2005] R.P.C. 9, ¶ 48 ("The *Catnic* principle of construction is therefore in my opinion precisely in accordance with the Protocol.").

<sup>63</sup> See *id.* ¶ 52 ("The limits to the value of the guidelines are perhaps most clearly illustrated by the present case . . ."). For a good discussion of some of the cases that applied the *Improver* questions, see Jenkins, Trade Mark and Patent Attorneys, Court of Appeal Gets to Grips with the Protocol, <http://www.jenkins.eu/pi-autumn-2002/court-of-appeal-gets-to-grips-with-the-protocol.asp>

<sup>64</sup> See *KSR v. Teleflex*, 550 U.S. 398 (2007)

<sup>65</sup> See European Patent No. 0148605B2 (filed Dec. 12, 1984); *Kirin-Amgen*, [2004] UKHL 46, ¶ 12.

<sup>66</sup> *Kirin-Amgen*, [2004] UKHL 46, ¶ 13.

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PAGE' testing method than existing EPO derived from extraction from urine;<sup>67</sup> and

*Claim 26*: EPO which is the product of the expression in a host cell of a DNA sequence according to claim 1.<sup>68</sup>

It must be noted at this juncture that the issue of infringement of the DNA sequence itself (claim 1) never 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.<sup>69</sup>

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).<sup>70</sup> In order to understand the court's resolution of 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.<sup>71</sup>

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.<sup>72</sup> 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."<sup>73</sup>

Much in line with its principle of construction outlined earlier, Lord Hoffman made it abundantly clear that this is where the analysis should end. The claim had been construed 'purposely', and on the facts there was no infringement. He specifically disapproved of any further attempt to apply the protocol questions over and above that construction.<sup>74</sup>

#### 4. After-Arising Technologies

As to whether or not a variant created using an after-arising technology is likely to infringe under the purposive construction

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<sup>67</sup> *Id.* ¶ 14.

<sup>68</sup> *Id.* ¶ 15.

<sup>69</sup> *Id.*

<sup>70</sup> *Id.* ¶ 53.

<sup>71</sup> *Id.* ¶ 10.

<sup>72</sup> *Id.* ¶¶ 58, 80.

<sup>73</sup> *Id.* ¶ 58.

<sup>74</sup> *Id.* ¶ 70.

approach depends upon the level of generality of the claim in issue. Illustratively, consider a claim that used the term “electronic storage device” and had been published during the era of CDs, when DVD technology was not yet known. It is reasonable to suggest that the term “electronic storage device” ought to be construed to include DVD technology as well. As Lord Hoffman noted in *Amgen*:

I do not dispute that a claim may, upon its proper construction, cover products or processes which involve the use of technology unknown at the time the claim was drafted. . . . In the present case, however . . . the man skilled in the art would not have understood the claim as sufficiently general to include gene activation. He would have understood it to be limited to the expression of an exogenous DNA sequence which coded for EPO.<sup>75</sup>

In other words, unless the claim is general enough to cover variants that deploy after-arising technology, without running the risk of being invalidated for lack of sufficient disclosure or enablement,<sup>76</sup> it may not be possible to construe such a claim to include the said variant. What makes the issue of after-arising technology more difficult to cover in the English context is the fact that the skilled person is to construe the claim as on the date of the publication of the patent application.<sup>77</sup> Therefore, such person does not have the benefit of the after-arising technology with which to construe such a claim and thereby to include a variant within its scope.<sup>78</sup>

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<sup>75</sup> *Id.* ¶ 53.

<sup>76</sup> See Patents Act, 1977, c. 37, § 14(5)(c) (U.K.), which tallies with the EPC, *supra* note 39, art. 84, 1065 U.N.T.S. at 279, and requires that “[t]he claim or claims shall be supported by the description.” Of course, the lack of enablement would not impact the scope of the claim during a “purposive constructive” assessment, but may result in the claim being invalidated separately.

<sup>77</sup> The second *Improver* question asks: “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[?]” *Improver Corp. v. Remington Consumer Prods. Ltd.* [1990] F.S.R. 181, 189 (Pat. Ct.).<sup>77</sup>

<sup>78</sup> Lord Justice Jacob, a leading English IP judge is also unsympathetic to the idea of protecting an unforeseeable equivalent. See Lord Justice Jacob, Claim Construction and Equivalents: A Paper for the Shanghai IP Symposium (July 2008) (manuscript at 5-6), available at [http://121.199.41.177/QBPC/uploads/download/Claim%20Construction%20and%20Equivalents%20\\_by%20Justice%20Jacob.doc](http://121.199.41.177/QBPC/uploads/download/Claim%20Construction%20and%20Equivalents%20_by%20Justice%20Jacob.doc).

**D. The EPC and Protocol: Delineating the Contours**

Lord Hoffman categorically asserted that the modern English approach to the interpretation of claims and infringement (as articulated by the *Catnic* “purposive construction” approach) is in conformity with Article 69 of the EPC and the corresponding Protocol.<sup>79</sup> This statement assumes tremendous significance, given that English law cannot travel beyond the bounds of the EPC. Consequently, there are limits to any potential expansion of the purposive construction approach to accommodate variants or equivalents.

Article 69 EPC has two parts: a substantive part, and a ‘Protocol’ (agreement) on its interpretation. The substantive part states that “[t]he extent of the protection conferred by a European 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.”<sup>80</sup>

The Protocol then goes on to elaborate:

Article 69 should not be interpreted as meaning 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. Nor should it be taken to mean 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 patent proprietor has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patent proprietor with a reasonable degree of legal certainty for third parties.<sup>81</sup>

In so far as English law is concerned, section 125 of the Patents Act, 1977 mirrors Article 69:

(1) [A]n invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise

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<sup>79</sup> *Kirin-Amgen*, [2004] UKHL 46, ¶ 30.

<sup>80</sup> EPC, *supra* note 39, art. 69(1), 1065 U.N.T.S. at 275, available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ar69.html>.

<sup>81</sup> European Patent Convention, Protocol on the Interpretation of Article 69, art. 1, Nov. 29, 2000, available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ma2a.html>.

requires, be taken to be that specified in a claim of the specification of the application or patent, . . . 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 Convention . . . shall . . . apply for the purposes of subsection (1) above as it applies for the purposes of that Article.<sup>82</sup>

In order to appreciate the import of Article 69, as interpreted by the Protocol, consider the following categories:

(i) Where the literal meaning of a term used in the claim is not clear:

In such a case, the straightforward principle of claim construction that is followed in European countries and indeed in most other jurisdictions around the world is to look to the specification and drawings to interpret the claim. Illustratively, in *Catnic*, one might argue that the import of the term “vertical” was not clear from the claims. Therefore, it could either be construed as “ninety degrees” or as something distinct from horizontal and therefore “representing a close range of degrees that was close to ninety degrees.” One would then look to the specification and the drawings, which made it clear that the patentee did not intend to restrict the term to only ninety degrees, but wished to include a range of degrees close to ninety degrees.<sup>83</sup>

(ii) Where the literal meaning of a term used in the claim is clear. However, when one looks to the specification and drawings, another meaning appears:

In such a case, Article 69 as interpreted by the Protocol demands that the term should be invested with the meaning that emerges from the specification and the drawings. One might argue that the *Catnic* “vertical” usage falls within this category, as opposed to the earlier one discussed above. In other words, the term vertical used in the claims would have strictly meant ninety degrees. This is buttressed by the fact that the patentee used the term “substantially horizontal” in the same claim and omitted to use the term “substantially” in relation to “vertical.”<sup>84</sup>

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<sup>82</sup> Patents Act, 1977, c. 37, § 125 (1977) (Eng.).

<sup>83</sup> *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1982] R.P.C. 183, 244.

<sup>84</sup> *Id.*

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However, on an examination of the specification and the drawings, a person skilled in the art was likely to appreciate that the absence of the qualifying term “substantially” was inadvertent and that the term “vertical” meant a range of degrees close to ninety degrees. Under the EPC and the protocol, it is this reading of the claim that must prevail. In other words, although the literal meaning may be clear, one cannot interpret it in clinical isolation and must necessarily look to the specifications and drawings. This category best exemplifies the essence of the “purposive construction” doctrine.

(iii) Where the literal meaning of a claim term is clear, and the specification does nothing to indicate that the term includes the allegedly infringing variant:

In such a case, both the EPC and English law (which conform in this regard) are likely to exclude any protection to the variant. It again bears reiteration that Article 69 stipulates that the meaning of a term has to be found in the claims.<sup>85</sup> And this is where English law differs from other jurisdictions, which explicitly recognize a doctrine of equivalents or other similar doctrine, where one need not necessarily fit the variant within the language of the claim.

This category is well illustrated in *Amgen*, where the term “host cell” used in the claims could not have meant an ordinary human cell with an exogenous promoter.<sup>86</sup> Under English law, the relevant date for assessing how the skilled person might have construed the claim is the date of publication of the patent. In *Amgen*, as of the date of publication of the patent, TKT’s endogenous gene activation technology was not yet discovered or contemplated.<sup>87</sup> Consequently, it is difficult to argue that a term such as “host cell” used in the claim could be taken to include TKT’s process where no “host cell” was used.

This category exemplifies the outer limits of the purposive construction doctrine and helps strike a distinction with the U.S. position, where a variant does not need to be bound to the language of a claim in order for the patentee to be protected. While discussing the U.S. doctrine of equivalents, Lord Hoffman opined that “once the monopoly had been allowed to escape from the terms of the claims, it is not easy to know where its limits should

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<sup>85</sup> See EPC, art. 69(1), available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ar69.html>.

<sup>86</sup> *Kirin-Amgen v. Hoechst Marion Roussel Ltd.*, [2004] UKHL 46, [2005] R.P.C. 9.

<sup>87</sup> *Id.* ¶ 79.

be drawn.”<sup>88</sup> Lord Hoffman observed that the Supreme Court’s worry in *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.* that the doctrine of equivalents had “taken on a life of its own, unbounded by the patent claims”<sup>89</sup> seemed to be true.<sup>90</sup>

The above categories are not neat divisions and may perhaps morph into each other. Imperfect as they are, they demonstrate the analytical distinctions sought to be drawn and help one to appreciate the import of Article 69 and purposive construction.

### 1. EPC 2000

In the light of revisions to the EPC and the use of the term “equivalents” for the first time, the above interpretation may be thrown into some doubt. The revisions effected by the European Patent Convention (EPC 2000) and the corresponding protocol came into force on December 13, 2007. The amended protocol now has two parts:

Article 1, the first part, reproduces the existing Protocol requirement. Article 2, interestingly titled “Equivalents”, states that, “[f]or 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.”

Since Article 2 uses the term “equivalent”, one might ask whether or not the EPC now protects “equivalents” that lie outside the language of the claim, but nonetheless fall within the scope of the inventive concept. It may be noted that neither the term “equivalent” nor any of the other terms used in this Article (“due account,” “element,” “specified”) have been defined.

Firstly, it is clear that Article 69, which stipulates that “the extent of the protection conferred by a patent or a European patent application shall be determined by the terms of the claims,” would still reign supreme. It is only the protocol which interprets Article 69 that has changed and not Article 69 itself. As discussed earlier, Article 69 makes clear that one cannot travel beyond the language of a claim. This is further clarified by the amended wordings of Article 69(2) which now states that:

For the period up to grant of the European patent, the extent of the protection conferred by the European patent application shall be determined by the claims contained in the application as published. However, the European patent as granted or as amended in opposition, limitation or revocation

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<sup>88</sup> *Id.* ¶ 39.

<sup>89</sup> 520 U.S. 17, 28-29 (1997)

<sup>90</sup> *Kirin-Amgen* [2004] UKHL 46, ¶ 39.

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proceedings shall determine retroactively the protection conferred by the European patent application, *in so far as such protection is not thereby extended*. (Emphasis added).<sup>91</sup>

If Article 69 does not permit one to travel outside the language of the claims it is difficult to see how the use of the word “equivalent” in the Protocol, an inferior explanatory instrument, might permit one to do so. Perhaps the term “equivalent” only means that one must consider the possibility of variants, when one construes a term used in the claim in accordance with the descriptions and drawings. And this precisely is what Lord Hoffman stated in *Amgen*:

Although article 69 prevents equivalence from extending protection outside the claims, there is no reason why it cannot be an important part of the background of facts known to the skilled man which would affect what he understood the claims to mean. That is no more than common sense. It is also expressly provided by the new article 2 added to the Protocol by the Munich Act revising the EPC, dated 29 November 2000 (but which has not yet come into force).<sup>92</sup>

Assuming a court takes an alternative interpretation and permits variants outside the scope of the claims (category 3 discussed above) in a manner closely resembling the US doctrine of equivalents, this might lead to some inconsistency in relation to the law governing amendments to claims. Both the EPC<sup>93</sup> and English law<sup>94</sup> (which is meant to conform to the EPC) do not permit any amendments that extend the scope of the claims. If a claim cannot be amended during the normal course (either during prosecution after the date of publication or during infringement proceedings) in a manner that extends its scope, it would be rather incongruous to permit a court, during infringement proceedings, to enjoin an equivalent that falls outside the scope of the claim.

Apart from the above, as Lord Hoffman rightly notes in *Amgen v. TKT*, any expansion in patent scope beyond the terms of

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<sup>91</sup> EPC, *supra* note 39, art. 69(2), 1065 U.N.T.S. at 275, available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ar69.html>.

<sup>92</sup> *Kirin-Amgen* [2004] UKHL 46.

<sup>93</sup> See EPC, *supra* note 39, art. 123, 1065 U.N.T.S. at 275, available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ar123.html>.

<sup>94</sup> See Patents Act, 1977, c. 37, §§ 27 ("general power to amend specification after grant") and 75 ("amendment of patent in infringement or revocation proceedings") (1977) (Eng.).

the claim would unreasonably expose the patent to claims of invalidity on grounds of anticipation or insufficiency.<sup>95</sup>

### **E. Conclusion**

On its face, the purposive construction theory appears to be blessed with an elegance and simplicity that other theories governing immaterial variants or equivalents lack. However, as noted earlier, its key limitation lies in the fact that it cannot protect an equivalent or variant that lies beyond the language of the claims. As to whether this is good or bad policy is a moot issue. Some may argue, as Lord Hoffman did, that it provides more clarity and is less expensive for litigants than the American doctrine of equivalents. But does it provide fair protection to the patentee? So long as the variant in question is in some way supported by the specification, ought not the patentee to be permitted to prevent such unscrupulous copying? This concern is particularly acute when drafting difficulties make it apparent that the perfect claim is an unattainable ideal.

This is a policy issue that might need to be tackled in a separate paper altogether. For the moment however, English law will only protect those variants that fall within the language of a claim.

The EPC 2000 is unlikely to change much in this regard, at least in so far as the English courts are concerned. But if it is eventually read in a manner that permits an expansion of the scope of a patent to cover variants outside the language of a claim in the same way as the US doctrine of equivalents, the courts may need to work out a way to help tether this expansion in some meaningful way. Otherwise, English courts may find themselves exhibiting the same anxiety that once afflicted their U.S. counterparts, who in the Supreme Court decision *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.* lamented the fact that the doctrine of equivalents had “taken on a life of its own, unbounded by the patent claims.”<sup>96</sup>

Only time will tell as to how the tricky issue of equivalents is likely to play out in the UK. In the meantime, the jury is out as to which country has the right answer in this regard. If the goal is to appropriately balance fair protection to the patentee with adequate notice of patent breadth to third parties, one might argue that English law does come close to striking such an optimal balance.

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<sup>95</sup> *Kirin-Amgen* [2004] UKHL 46, ¶ 47.

<sup>96</sup> 520 U.S. 17, 28-29 (1997).

#### IV. GERMANY\*

##### 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.<sup>97</sup> Unfortunately, this Article leaves broad room for interpretation and is not understood in the same way all across Europe. For this reason, instead of a “final” European doctrine, this paper only presents the German view on this topic.<sup>98</sup>

##### B. Basic Principles of Claim Construction in German Law

The statutory provisions governing the interpretation of patent claims and the determination of patent scope in German law are laconic. As discussed above, 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 Article 69 as discussed above.<sup>99</sup> 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.

Since the Protocol on the Interpretation is part of the EPC,<sup>100</sup> “equivalents” is becoming a statutory legal term for the first time. But what are equivalents to elements specified in the claims? This question is not addressed and is therefore left to be answered by the courts. We have seen the English approach above and will now set out how the *Bundesgerichtshof*<sup>101</sup> has defined a position which according to its assessment combines a fair protection for the patent proprietor with a reasonable degree of certainty for third parties.

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\* *Peter Meier-Beck* Dr. iur., Judge at the Bundesgerichtshof, Karlsruhe, Germany, Honorarprofessor at the Heinrich-Heine-Universität, Düsseldorf, Germany; *Max v. Rospatt*, Attorney at Law and Partner at rospatt osten pross, Düsseldorf, Germany.

<sup>97</sup> All member states of the European Union, as well as a few more European states, particularly Switzerland.

<sup>98</sup> Section 14 of the German Patent Law (PatG) corresponds almost literally to Article 69(1) EPC.

<sup>99</sup> Protocol, *supra* note 81.

<sup>100</sup> EPC, art. 164(1), available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ar164.html>.

<sup>101</sup> The *Bundesgerichtshof* is the Supreme Court for civil and penal matters in Germany. The author *Peter Meier-Beck* is a member of its 10<sup>th</sup> Senate which is the patent law division.

The basis for determining the scope of protection is the interpretation of the patent claim.<sup>102</sup> 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. 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, that is, a person who is active in the technical field of the invention.<sup>103</sup>

2. The 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.<sup>104</sup> This is called “function-aimed interpretation” or “purposive construction.”<sup>105</sup> 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.<sup>106</sup>

3. 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

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<sup>102</sup> EPC, art. 69(1), available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ar69.html>.

<sup>103</sup> Bundesgerichtshof [BGH] [Federal Court of Justice] Mar. 2, 1999, Case No. X ZR 85/96, as translated in 30 *Intellectual Review of Industrial Property and Copyright Law* [IIC] 932, 939 (Spannschraube [Tension screw]).

<sup>104</sup> *Id.* at 939; BGH Nov. 7, 2000, Case No. X ZR 145/98, as translated in 33 *IIC* 647, 649 (Briefflocher [Letter Punch]).

<sup>105</sup> Uwe Scharen, BENKARD, EUROPÄISCHES PATENTÜBEREINKOMMEN [EUROPEAN PATENT CONVENTION] 704 (2002); Peter Meier-Beck, *The Latest Issues in German Patent Infringement Proceedings*, 2000 *Gewerblicher Rechtsschutz und Urheberrecht* [GRUR] 355, translated in 32 *IIC* 505, 511-14 (2001).

<sup>106</sup> Friedrich-Wilhelm Engel, *The “Wortsinn” of Patent Claims in German Case Law on Patent Infringement Disputes*, 34 *IIC* 233 (242) (2003); Peter Meier-Beck, *Aktuelle Fragen der Schutzbereichsbestimmung im deutschen und europäischen Patentrecht* [Current Issues of Identifying the Scope of Protection in German and European Patent Law], 2003 *GRUR* 905.

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context of the entire claim and the set of claims, whereby using the description including cited prior art and his common general knowledge again to understand the claim as a whole.<sup>107</sup> This is generally referred to as “context-aimed interpretation.”<sup>108</sup> 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: “patent specifications virtually represent their own lexicon.”<sup>109</sup>

Interpreting the patent claim according to these basic principles is referred to generally in case law as “determination of the meaning of the wording” (*Wortsinn*) or “determination of the technical meaning” of the patent claim.<sup>110</sup> The interpretation is solely based on the claim, the claim set, the description, the cited prior art, and the general common knowledge. The file wrapper is therefore not considered.<sup>111</sup>

This level of examination is of profound importance for patent infringement proceedings: if the contested embodiment incorporates every single feature of the claim, properly construed, then the patent is infringed.<sup>112</sup> In this case, much like the position in the United Kingdom 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, and the scope of protection extends beyond the mere wordings of the claim. One of the central questions in patent law is therefore how this scope of protection is to be determined. Where is the border to be drawn between that area, that is to be reserved for the patentee for the protection of his or her inventive achievement, and the neighboring area, which every competitor can use to compete with the patentee? This issue is closely connected with a second question:

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<sup>107</sup> *Tension Screw*, 30 IIC 932.

<sup>108</sup> Meier-Beck, *supra* note 76, at 511-14.

<sup>109</sup> *Tension Screw*, 30 IIC at 939.

<sup>110</sup> BGH June 14, 1988, Case No. X ZR 5/87, *as translated in* 22 IIC 249, 253 (Ionenanalyse [Ion Analysis]).

<sup>111</sup> BGH Mar. 12, 2002, Case No. X ZR 43/01, *as translated in* 34 IIC 302 (Kunststoffrohrteil [Plastic Pipe]).

<sup>112</sup> *Ion Analysis*, 22 IIC at 253.

how can this borderline be drawn so that it is clearly delineated—that is 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 of the EPC:<sup>113</sup> appropriate protection for the patentee on the one hand, and sufficient legal certainty for third parties on the other. As discussed above, the United Kingdom has its own doctrine that, in the view of its courts, correctly applies the rules provided by the EPC. Similarly, the *Bundesgerichtshof* has developed a test for applying these laws, but the result is not identical to that of the British courts.

In terms of competition law, defining the border of the scope of protection means to distinguish 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.<sup>114</sup> A focus on this competition-controlling function helps one appreciate the importance of laying down a clearly discernable borderline. Unfortunately, optimal discernability of such a borderline does not easily correspond to the optimal economic balance between patent protection and freedom of competition. If the criterion of predictability is treated as absolute, it is very hard to grant reasonable scope to the patent and to draw this line appropriately. The scope of protection would 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.

Insofar as Article 2 of the Protocol on the Interpretation of Article 69 states that the scope of protection conferred by a patent is to be extended to variants or ‘equivalents’ it only puts in different words what can now already be derived from Article 69(1) of the EPC. However, neither the EPC nor the Protocol set out *how* the scope of protection is to be determined. Article 69(1) of the EPC only dictates that the patent claims are the main reference point for defining scope. According to the principles developed by the *Bundesgerichtshof*, the patent claims form not only the starting point, but also the decisive basis for determining

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<sup>113</sup> Protocol, *supra* note 81.

<sup>114</sup> BGH July 13, 2004, Case No. KZR 40/02, *as translated in* 36 IIC 741 (Standard-Spundfass [Standard Tight-Head Drum]).

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the extent of protection: protection must align with the patent claims.<sup>115</sup>

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. Article 1 of the Protocol demands a position “which combines a fair protection with a reasonable degree of legal certainty for third parties.”<sup>116</sup> Therefore, it is the task of the courts to find criteria for the determination of the scope of protection which reconcile both demands.

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, analyzing the patent claim and using the description and the drawings to interpret the claim.<sup>117</sup> 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.<sup>118</sup> 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 (demand for fair protection). 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 (demand for legal certainty).

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?<sup>119</sup> 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,

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<sup>115</sup> See BGH Nov. 29, 1988, Case No. X ZR 63/87, 104 Entscheidungen des Bundesgerichtshofes in Zivilsachen [BGHZ] 84, *as reprinted in* 1989 GRUR 205 (Schwermetalloxidationskatalysator [Heavy Metal Oxidation Catalytic Converter]).

<sup>116</sup> Protocol, *supra* note 81, art. 1.

<sup>117</sup> *Id.* (mentioning explicitly the “consideration of the description and drawings by a *person skilled in the art*” (emphasis added)).

<sup>118</sup> *Ion Analysis*, 22 IIC 249.

<sup>119</sup> Judge Rader assumes an obligation of the patentee “to draft claims that capture all reasonably foreseeable ways to practice the invention” in his concurring opinion in *Johnson & Johnston Associates Inc. v. R.E. Service Co.*, 285 F.3d 1046, 1057 (Fed. Cir. 2002) (Rader, J., concurring).

when we need his advice.<sup>120</sup> When revoking or invalidating a patent, because the person skilled in the art would have combined two prior 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 him or herself.<sup>121</sup> 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 four 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,<sup>122</sup> thereby referring back to the English model of purposive construction under *Catnic*<sup>123</sup> and later elucidated by Justice (as he then was) Leonard Hoffmann in what came to be commonly called the *Improver* questions.<sup>124</sup>

1. The first question is: *Does the modified embodiment solve the problem underlying the invention by means which have objectively the same technical effect?*<sup>125</sup>

This question resembles the first *Improver* question,<sup>126</sup> but it is not identical to it. Nor does it ask about how the invention “works” or the function-way-result test; rather, it only asks about

<sup>120</sup> BGH Sept. 7, 2004, Case No. X ZR 255/01, *as translated in* 36 IIC 971, 975 (Bodenseitige Vereinzelnungseinrichtung [Bottom Separating Mechanism]).

<sup>121</sup> According to the could-would test, *see, e.g., In re Rider*, Case No. T2/83, 1984 Official Journal of the European Patent Office [OJ. EPO] 265, ¶ 7 (EPO Boards of Appeal, Mar. 15, 1984), *available at* <http://legal.european-patent-office.org/dg3/biblio/t830002ep1.htm>, a novel teaching is considered not inventive if the man skilled in the art could *and would* have carried it out.

<sup>122</sup> BGH Mar. 12, 2002, Case No. X ZR 168/00, *as translated in* 33 IIC 873 (*Schneidmesser I* [Cutting Blade I]).

<sup>123</sup> *Catnic Components Ltd. v. Mill & Smith Ltd.*, [1982] R.P.C. 163 (H.L.) (U.K.).

<sup>124</sup> *See Improver Corp. v. Remington Consumer Products Ltd.*, [1990] R.P.C. 69, [1990] F.S.R. 181 (U.K.).

<sup>125</sup> *Cutting Blade I*, 33 IIC at 875 (whether “it solves the problem underlying the invention with modified but objectively equivalent means”).

<sup>126</sup> “Does the variant have a material effect upon the way the invention works?” *Improver*, 1990 F.S.R. at 182.

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the result of this effort. The identical result has to be achieved at least to a practically relevant degree.<sup>127</sup> A merely similar effect is not sufficient.

There is the obvious objection that this question could be subjected to concerns raised by Lord Justice Robin Jacob with regard to the first Improver-question, in that the requirement by Article 69 of the EPC that the interpretation be in the context of the patent claim is not met.<sup>128</sup> 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.<sup>129</sup> Only such variants can be said to have the same technical effect that produce results 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.<sup>130</sup> 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.<sup>131</sup>

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 expertise on the priority date to find the modified means as having the same effect?*<sup>132</sup>

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.<sup>133</sup>

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.<sup>134</sup> Because what the person skilled in the

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<sup>127</sup> BGH June 28, 2000, Case No. X ZR 128/98, as translated in 33 IIC 349, 351 (*Bratgeschirr* [Roasting Pots]).

<sup>128</sup> Lord Justice Jacob, *Last Word: A Letter from Justice Jacob*, 2003 Patent World 155.

<sup>129</sup> See *Roasting Pots*, 33 IIC at 350; *Cutting Blade I*, 33 IIC at 874-75.

<sup>130</sup> *Roasting Pots*, 33 IIC at 351.

<sup>131</sup> See *id.*

<sup>132</sup> See *Cutting Blade I*, 33 IIC at 875 (“[T]he person skilled in the art is able to use his specialist knowledge to identify the modified means as having the same effect.”).

<sup>133</sup> BGH Oct. 24, 1986, Case No. X ZR 45/85, as translated in 19 IIC 243, 243-44 (*Befestigungsvorrichtung* [Fixing Device]).

<sup>134</sup> *Id.*

art is not able to find and to do based on the patent and helped by his or her knowledge in the art, is not to be granted to the patentee.<sup>135</sup> 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 one or two 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.<sup>136</sup> The format for this question is given by the *Bundesgerichtshof* in the decision “*Schneidmesser I*”, as explained below.

3. *While answering question two, 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)?*<sup>137</sup>

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.<sup>138</sup> 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).<sup>139</sup> 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

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<sup>135</sup> BGH May 15, 1975, Case No. X ZR 35/72, as reprinted in 1976 GRUR 88 (89/90) (*Ski-Absatzbefestigung* [Ski Heel Attachment]) (discussing the requirement that patents have clear, technically simple claims which can be deciphered by an expert).

<sup>136</sup> See *Cutting Blade I*, 33 IIC at 875.

<sup>137</sup> See *id.* at 875.

<sup>138</sup> See *Roasting Pots*, 33 IIC at 350.

<sup>139</sup> See *Cutting Blade I*, 33 IIC at 876.

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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.<sup>140</sup>

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.<sup>141</sup> 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.<sup>142</sup> 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 anymore. On the other hand, the standard for deciding whether a modified means of 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, it is the patent claim which determines the scope of the patent.<sup>143</sup>

4. *Is the modified embodiment anticipated or made obvious by the state of the art?*<sup>144</sup>

This question, which is known as the *Formstein* objection in German case law,<sup>145</sup> is necessary to prevent a scope of protection (after the previous three questions have been answered in the affirmative) that is too 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 at the time of patenting.<sup>146</sup> It is only the direct subject matter of the patent application that is examined for patentability during the grant procedure.<sup>147</sup> The Patent Office does

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<sup>140</sup> See *Heavy Metal Oxidation Catalytic Converter*, 1989 GRUR (208).

<sup>141</sup> *Improver Corp. v. Remington Consumer Products Ltd.*, [1990] R.P.C. 69, [1990] F.S.R. 181 (U.K.).

<sup>142</sup> See *Cutting Blade I*, 33 IIC at 875.

<sup>143</sup> See EPC, art. 69(1), available at <http://www.epo.org/patents/law/legal-texts/html/epc/2000/e/ar69.html>.

<sup>144</sup> See *Cutting Blade I*, 33 IIC at 875.

<sup>145</sup> See BGH Apr. 29, 1986, Case No. X ZR 28/85, as translated in 18 IIC 795 (*Formstein* [Molded Curbstone]) (allowing objection for the first time).

<sup>146</sup> *Id.* at 800.

<sup>147</sup> See BGH Nov. 7, 2000, Case No. X ZR 145/98, as translated in 33 IIC 647, 648 (*Brieflocher* [Letter Punch]).

not determine what, having regard to the state of the art, the adequate scope of protection for the subject matter ought to be.<sup>148</sup> Consequently, such a determination has to be made at the stage of infringement proceedings.

It is pertinent to note that unlike U.S. 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 *Kunststoffrohrteil* decision, which states that Article 69 of the EPC does not mention the file history as a means of interpretation.<sup>149</sup> However, this may not be the only reason. As mentioned in *Kunststoffrohrteil* itself, there is no practical need to consider events that took place during the grant procedure.<sup>150</sup> Either an equivalent solution is not patentable in view of the state of the art— in which case the *Formstein* objection prevents the patentee from being given protection for it.<sup>151</sup> Or, during the grant procedure, the patentee has assumed erroneously, or has 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 harbored by the patentee or mentioned by him during the grant procedure are without meaning.<sup>152</sup>

### E. Conclusion

The German approach to the question of equivalents can be summarized as follows:

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 a 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

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<sup>148</sup> *Id.* at 648.

<sup>149</sup> See BGH Mar. 12, 2002, Case No. X ZR 43/01, *as translated in* 34 IIC 302, 303 (*Kunststoffrohrteil* [Plastic Pipe]).

<sup>150</sup> *Id.* at 307.

<sup>151</sup> See *Molded Curbstone*, 18 IIC 795.

<sup>152</sup> See *Plastic Pipe*, 34 IIC at 307.

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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 (and not just the prior art) 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 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)?*

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

## **V. JAPAN\***

### **A. Introduction**

Our analysis of the doctrine of equivalents in Japan has been prepared by an insider, former Tokyo High Court Judge Yukio Nagasawa. In his account he references another leading IP jurist, Ryoichi Mimura, now a judge on the Tokyo IP High Court. His role in the creation of the doctrine of equivalents is an important part of the story for it was only in 1998 that the doctrine of equivalents came to be accepted under Japanese law via the famous Supreme Court decision, *THK Co. v. Tsubakimoto Seiko Co.* (commonly referred to as the *Ball Spline* decision).<sup>153</sup> Prior to this, although major academic theories supported this doctrine, judicial decisions did not.<sup>154</sup>

### **B. Before *Ball Spline*: Identity as a Technological Idea**

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

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<sup>153</sup> *Tsubakimoto Seiko v. THK K.K. (Ball Spline)*, 52 MINSHŪ 113 (Sup. Ct., Feb. 2, 1998).

<sup>154</sup> See Judge Ryoichi Mimura, *Hanrei Kaisetsu* [Court Precedent Commentary], 10 SAIKŌ SAIBANSHO HANJI KAISETSU MINJI HEN [COMMENTS TO THE SUPREME COURT PRECEDENTS] 112, 132 (1998) [hereinafter *Hanrei Kaisetsu*].

that such a doctrine was part of equity and express statutory provisions were not necessary to validate such a doctrine.<sup>155</sup>

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.<sup>156</sup>

(ii) *Ease of interchangeability*: Such interchangeability as mentioned above is easily conceived of by a person of ordinary skill in the art.<sup>157</sup>

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 labeled as “identity as a technological idea.”<sup>158</sup> 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.<sup>159</sup>

Although there were academic theories to support a doctrine of equivalents, many judges were reluctant to read a doctrine of equivalents into Japanese patent law. Some judges ventured to do so, however, despite the absence of a Supreme Court precedent.<sup>160</sup>

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.<sup>161</sup> One of their reasons for doing so could be that these courts might have

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<sup>155</sup> See *id.* at 125.

<sup>156</sup> *Id.* at 126.

<sup>157</sup> *Id.* at 127.

<sup>158</sup> *Id.* at 140.

<sup>159</sup> See Takashi Honma, *Saikousai Hanketu (mugen shudou you boru supurain jikuuke jiken) kara mita 21seiki ni okeru wagakuni no tokkyokenn no kennri 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)], 48 CHIZAI KANRI [INTELLECTUAL PROPERTY MANAGEMENT] 1795, 1796 (1998). Mr. Takashi Honma, a Japanese attorney, has had significant experience with patent matters.

<sup>160</sup> See *Hanrei Kaisetu*, *supra* note 154, at 132.

<sup>161</sup> See Etsuji Kotani, *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 the *Ball Spline* Case and Future Issues], in TOKKYO SAIBAN NI OKERU KINTOURON [THE DOCTRINE OF EQUIVALENTS IN PATENT LITIGATION] 15, 16 (Murabayashi et al. eds., 2003). Mr. Kotani has substantial experience as a Japanese patent attorney.

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.

### C. The *Ball Spline* Decision: The Essential/Inessential Distinction

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*. The opinion is relatively brief and its essence is found in the following two paragraphs. The reader should bear in mind that by far the most important requirement of the five listed below is requirement one<sup>162</sup>:

In determining whether an accused product or method falls within the technical scope of a patented invention, the technical scope of the invention must be determined with respect to the claim (see Patent Law Section 70 (1)). If there are elements that differ between the claim and the accused product, the accused product and the like cannot be said to fall within the technical scope of the patented invention. On the other hand, even if there are elements in the claim that differ from the corresponding product and the like, the corresponding product and the like may be equivalent and may appropriately be said to fall within the technical scope of the patented invention if the following conditions are satisfied: (1) *the differing elements are not the essential elements in the patented invention*; (2) even if the differing elements are interchanged by elements of the accused product and the like, the object of the patented invention can be achieved and the same effects can be obtained; (3) by interchanging as above, a person of ordinary skill in the art to which the invention pertains (hereinafter referred to as an artisan) could have easily arrived at the accused

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<sup>162</sup> This requirement underlies most of the rejections of cases in which the doctrine of equivalents has been invoked since the *Ball Spline* decision. See DOCTRINE OF EQUIVALENTS IN PATENT LITIGATION, *supra* note 161, app. at 708-13 [hereinafter *Ball Spline Tables*] (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]).

product and the like at the time of manufacture; (4) the accused product and the like are not the same as the known art at the time of application for patent or could not have been easily conceived by an artisan at the time of application for patent; and (5) there is not any special circumstances such that the accused product and the like are intentionally excluded from the scope of the claim during patent prosecution).

### 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*.<sup>163</sup> Although the responsibility of the Supreme Court researcher in Japan is similar to law clerks of the U.S. 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 advice to the Supreme Court in the *Ball Spline* case corresponds with his views in *Hanrei Kaisetsu*.

A key aspect of Judge Mimura's argument in *Hanrei Kaisetsu* is that the positive requirements under the *Ball Spline* decision can be co-related with the requirements spelt out by scholars who were in favor of the doctrine of equivalents (hereafter referred to as positive theory).<sup>164</sup>

The first positive requirement, "Essential Part," is the same as "identity as a technological idea" of the positive doctrine. The second requirement, "Interchangeability," and the third, "Ease of interchangeability," are the same as the corresponding requirements of the positive doctrine prior to the *Ball Spline* decision.<sup>165</sup>

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.<sup>166</sup> However, his recommendations in *Hanrei Kaisetsu* have no binding power and we find no cases supporting his view that there is an essential/nonessential distinction in the law of the United States or that there ever was such a distinction in the past except insofar as it

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<sup>163</sup> See *Hanrei Kaisetsu*, *supra* note 154, at 101.

<sup>164</sup> *Id.* at 140.

<sup>165</sup> *Id.* at 140 n.4.

<sup>166</sup> *Id.* at 140 n.4. Judge Mimura states that the doctrine of equivalents cannot be applied to the essential part of the invention even in the United States and Germany, "as I mention below". However, he does not go on to discuss this issue "below" or in any of the following sections of his report.

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would be understood that an essential component can have no equivalent in the context of the claimed invention.<sup>167</sup> Arguably this may be said as well for Germany. However, ironically the essential/nonessential distinction was a part of U.K. law for many years. The last judicial statement discussing it is found in the opinion of Lord Justice Buckley in *Catnic Components Ltd. v. Hill & Smith Ltd.*, where he said:

If the alleged infringement of the claim has all the features of the claim it must infringe the claim, even if it also incorporates other features. If it lacks one of the features of the claim, it may or may not infringe the claim. If the feature which is lacking is an essential feature of the claim, there will be no infringement; but, . . . if it has all the essential features of the claim, it will infringe the claim notwithstanding the omission or substitution of an unessential feature. . . . So it becomes necessary to consider what distinguishes a feature of a claim which is essential from one which is not essential. . . . Will it be essential to the validity of the claim . . . or will it suffice that the patentee has elected to limit his claim by the inclusion in it of the feature in question, thus disclaiming a monopoly in anything not incorporating that particular feature?<sup>168</sup>

Indeed, it probably was the difficulty of determining whether an element was essential or not that led the House of Lords in the appeal from the decision of Lord Justice Buckley and his fellow judges on the Court of Appeal to abandon this approach to patent infringement altogether and to substitute therefore what it called “purposive construction.”<sup>169</sup>

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<sup>167</sup> Judge Shitara, a judge of the Tokyo High Court, argues that the three positive requirements of the *Ball Spline* decision are basically the same as the ‘function-way-result’ requirements of the U.S. test. Specifically, he argues that the U.S. requirements of the ‘way’ prong correspond to the ‘Essential Part’ prong in Japan (first requirement). See Judge Ryuichi Shitara, *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 the FESTO Supreme Court Decision and the International Comparative Study of the Doctrine of Equivalent in the US, UK, Germany, and Japan*], in CHITEKI ZAISANKEN, SONO KEISEI TO HOGO [INTELLECTUAL PROPERTY RIGHT, ITS CREATION AND PROTECTION] 141, 155 (Toshiaki Nagai, Kuniharu Yasue & Sachikuni Iwasaki eds., 2002). Judge Shitara, however, does not substantiate this claim well enough.

<sup>168</sup> *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1979] F.S.R. 619, 629-30 (C.A.) (U.K.).

<sup>169</sup> *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1982] R.P.C. 183, 243 (H.L.) (U.K.).

## 2. Defining “Essential Part”

Returning now to Japan, 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—can we dispense with it? The *Ball Spline* decision, which is binding precedent, clearly states that the essential part requirement is necessary and until now there has not been a single judicial decision that has dispensed with the essential part requirement. It is extremely difficult to change precedent in Japan<sup>170</sup> 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 it.

A number of authorities have tried to suggest possible definitions of “essential part.” Judge Nishida, a presiding judge of the Tokyo High Court, argues that the definition of “essential part” cannot be found in the *Ball Spline* decision and cannot even be extrapolated from the *Ball Spline* decision.<sup>171</sup> He explains that there are two ways of interpreting the term “essential part”:

(i) *Literal Interpretation*: 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.<sup>172</sup> Thus, one has to decide what part of the claim is essential to the claimed invention.<sup>173</sup>

(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 *Ball Spline* decision.<sup>174</sup> 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

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<sup>170</sup> To change a precedent, an en banc (Grand Bench) decision of the Supreme Court of Japan is necessary.

<sup>171</sup> See Judge Yoshiaki Nishida, *Shingai soshō ni okeru kintō no hōri* [*The doctrine of equivalents in infringement litigation*], in CHITEKI ZAIHAN SOSHO HO [INTELLECTUAL PROPERTY LAW 182, 186 (Toshiaki Makino & Toshiaki Iimura eds., 2002)].

<sup>172</sup> *Id.* at 192.

<sup>173</sup> 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.

<sup>174</sup> See Nishida, *supra* note 171, at 192.

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features that result in the technological idea of the claimed invention.<sup>175</sup>

The often cited decision to extrapolate the meaning of essential part is a decision from the Tokyo High Court.<sup>176</sup> 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.<sup>177</sup>

(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.<sup>178</sup>

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 tried to follow this definition.<sup>179</sup> Moreover, as Mr. Jubin Matsumoto, a prominent litigator from Japan, argues, the court definition appears to have an inbuilt contradiction.<sup>180</sup> 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 involves considerations similar to “invention as a whole.”<sup>181</sup> If so, these two rules contradict each other.

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<sup>175</sup> *Id.* at 193.

<sup>176</sup> *Shinwa Seisakusyo v. Fulta Electric Machinery*, 1738 HANREI-JIHO 97 (Tokyo High Court, Oct. 26, 2000).

<sup>177</sup> *Id.* at 98.

<sup>178</sup> *Id.* at 98.

<sup>179</sup> See Kotani, *supra* note 161, at 19-20; see also BESSATSU JURISUTO 152-63 (Nobuhiro Nakayama, Hidetaka Aizawa & Tetsuya Oobuchi eds., 3d ed. 2004).

<sup>180</sup> See BESSATSU JURISUTO, *supra* note 179, at 159. Mr. Matsumoto commented on a judgment decided by the Osaka High Court on April 19, 2001. *Eli Lilly Japan K.K. v. Farmacia Akucheboraagu*, 2311 HANKO 2d 500 (Osaka High Ct., Apr. 19, 2001). 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.

<sup>181</sup> BESSATSU JURISUTO, *supra* note 179, at 159.

As mentioned above, *Hanrei Kaisetsu* 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 *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.<sup>182</sup> 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.

Given that in this imperfect world some definition must be found for “essential part” before there can be a proper function doctrine of equivalence in Japan, and thus far no clear definition has been put forth, the authors suggest that the decision should be based on the claim and the prior art.

Illustratively, if the patented invention is composed of elements *A* and *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*. This would be true even if *B* were not part of the prior art if had *B* been part of the prior art the combination would still be non-obvious. The advantage of this proposal is that it is both simple and predictable, because the claim has clear elements where the specification does not.

#### D. Conclusion

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 nine 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.<sup>183</sup> 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

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<sup>182</sup> See *Hanrei Kaisetsu*, *supra* note 154, at 140 n.4.

<sup>183</sup> See *Ball Spline* Tables, *supra* note 162.

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not existed, the doctrine of equivalents could have been applied to many more cases.

The current definition most relied on by courts seems to be based on the “all elements rule.” But *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.<sup>184</sup> 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.

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 some time.

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. It is hoped that future decisions would take the simple definition proposed in this paper into account.

**VI. CONCLUSION: WORKING WITH *KIRIN-AMGEN* HYPOTHETICALS**

If one applies the laws of each jurisdiction to a classic example of a trivial change in a device—for instance, replacing a conical cavity for carrying coal with a pyramidal cavity that has the exact same purpose and effect of evenly distributing the weight of the coal with a low center of gravity—these jurisdictions will not significantly differ. A U.S. court would, and did, find the device to be an infringing equivalent.<sup>185</sup> A U.K. court would likely find that such a change was obvious at the date of publication and that the patentee did not intend the term “conical” to only apply to rounded cavities. A German court would likely conclude that the teaching of the patent—that the conical cavity is designed to result in an even weight distribution of coal—meant that a person skilled in the art would have taken the embodiment into account as an

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<sup>184</sup> See *Hanrei Kaisetsu*, *supra* note 154, at 140 n.4.

<sup>185</sup> *Winans v. Deadmead*, 56 U.S. 330, 343 (1854).

equivalent solution, and a Japanese court would find the change inessential and obviously equivalent to one skilled in the art.<sup>186</sup>

That these jurisdictions would give the same answer to the question of infringement for such a simple case, however, does not mean that their solutions to the question of equivalents are the same. For a true comparison, these solutions must be applied to a more complex situation. One of the best ways to understand the doctrine of equivalence and the various approaches to it is therefore to work with the facts of *Kirin-Amgen*. It involved one of the most famous inventions of the biotech era, the identification of the gene coding for human erythropoietin upon which Amgen built one of the largest biotechnology companies in the world. The key to the Amgen invention was that Amgen was able to isolate the gene coding for human erythropoietin.<sup>187</sup> Once Amgen had the gene, then it was routine, but not easy, to insert the gene into Chinese hamster ovary (CHO) cells and get those cells to make human erythropoietin.<sup>188</sup> This invention, made in the early 1980s, was held not to be obvious by the Federal Circuit in 1991, *Amgen Inc. v. Chugai Pharmaceutical Co.*<sup>189</sup> At the time of the invention, the only known method of using an isolated gene to make its corresponding protein was to insert the isolated gene into a cell. The cell might well be termed a “host cell” for the gene came from outside the cell. A few years later a new technology initiated the era of gene activation. Instead of inserting a gene into a cell in order to have the cell manufacture the protein coded by the gene, gene activation technology activates human cells to make erythropoietin on their own.<sup>190</sup> After all, every human cell already contains the gene that codes for all human proteins. As applied to erythropoietin, once one can locate the erythropoietin gene within the genome of the cell then the new gene activation technique employs a promoter that it inserted into the human cells which turns the cell’s erythropoietin genes on thereby causing the cells to make human erythropoietin.<sup>191</sup> With the advent of this new gene activation technology, the U.K. courts encountered the issue of

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<sup>186</sup> A separate issue may present itself if one thinks the patent drafter in this situation should have drafted his claims to literally cover this embodiment. However, the discussion of this problem is outside the bounds of this Article. In any event, it is reasonable to assume that sloppy drafting cannot account for all equivalents that do not involve after-arising technology, inventive steps, or essential elements, and therefore, for these simple cases, these jurisdictions overlap.

<sup>187</sup> *Kirin-Amgen v. Hoechst Marion Roussel Ltd.*, [2004] UKHL 46, [2005] R.P.C. 9, ¶ 8.

<sup>188</sup> *Id.* ¶ 9.

<sup>189</sup> 927 F.2d 1200 (Fed. Cir. 1991).

<sup>190</sup> *Kirin-Amgen*, [2004] UKHL 46, ¶ 9.

<sup>191</sup> *Id.* ¶ 6.

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whether the cell that receives a promoter to make its own human erythropoietin may be called a “host cell.” After all that cell did not receive the human erythropoietin gene isolated by Amgen, but it did receive a promoter from outside the cell. Nevertheless, the House concluded that it was not a “host cell” and the House made it abundantly clear that this is where it felt the analysis should end.<sup>192</sup>

Arguably *Kirin-Amgen* on the facts was an easy case since the invention was finding the erythropoietin gene using two probes in a library of genes, a method of discovery that was viewed as an inventive step.<sup>193</sup> The gene activation technology did not require copies of the actual gene as did the standard method disclosed in the patent, but it did need knowledge of its nucleic acid sequence in order to put the exogenous promoter in the right place with respect to the erythropoietin gene that was already in the genome of the cell. It is easy to see that this was not enough to convince a court that the accused process should be considered an infringement. But what if a different inventor invented a machine which could do the same thing with an exogenous gene as the CHO cells of the patent? The new machine could be the subject of many of its own patents. What if one could not reasonably foresee the invention of such a machine so the patent drafter did not see a need for using a broader term than “host cell,” such as “means for making a protein upon the receipt of a gene coding for said protein?” Would the House of Lords have been so quick to reject the need for a doctrine of equivalents? How would such a situation be treated by other courts?

Clearly if the invention of such a machine was not reasonably foreseeable, then it likely would in the United States be considered an infringement when substituted for a CHO cell.<sup>194</sup> Similarly in Japan it should be clear that the CHO cell was not an essential feature since CHO cell lines were conventional technology at the time of Amgen’s invention. The situation in Germany would be different because when the specification was read by one skilled in the art at the time the patent issued, the skilled man would not envision substituting a host machine for a host cell.

Changing the hypothetical ever so slightly is even more illuminating. Let us assume that at the time the claims were drafted the host machine technology was just being developed. It worked but was quite expensive and no commercial process was possible

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<sup>192</sup> *Id.* ¶ 58.

<sup>193</sup> *Id.* ¶ 117.

<sup>194</sup> Unless, of course, the nature of the after-arising technology meant that the “way” part of the doctrine of equivalents test was not satisfied.

with such a host machine. After the patent issued a major change was made to the machine which rendered it a practical substitute for mammalian cells in the production of proteins from exogenous genes. At that point many in the biotech industry switched to this new machine technology.

In the United States if there were no estoppel, this new host machine would most likely be viewed as an equivalent. If, however, there was an estoppel with respect to the “host cell” limitation, then the picture is cloudier as it can fairly be argued that the idea of a host machine was reasonably foreseeable as a substitute for host cells even though the existing host machine did not work very well. In the United Kingdom there of course would be no infringement. In Germany the question would be whether the existence of a poorly functioning host machine would be enough to convince one of skill in the art that the claim was meant to cover host machines. Then the newly improved host machine of the accused process would simply be a dependent (improvement) invention on the invention covered by the claim. In Japan the question would still turn on the essential/nonessential distinction but the likely result would again be infringement. It is for the reader to answer then the question of whether any of these jurisdictions have it right.

There is some consensus that the narrowly read, literal meaning of the words of a claim is not enough to protect inventors against theft of their invention. However, the solution to this problem, the doctrine of equivalents, is by no means clear cut, and has thus developed quite differently in different jurisdictions.

The United States, the United Kingdom, Japan, and Germany each provide us with a different approach to the doctrine of equivalents. The United States arguably provides the broadest protection under the doctrine, counting foreseeable equivalents as infringing so long as they are not equivalent to an amended aspect of a claim, and unforeseeable equivalents as always infringing—with the caveat that unforeseeable equivalents have difficulty passing the “way” aspect of the equivalents test. The United Kingdom does not consider itself to have a doctrine of equivalents; rather, it conducts a similar analysis under purposive claim construction. This analysis may or may not find an unforeseeable, after-arising technology encompassed in the claim, depending on the generality of the language of the claim. An unforeseeable (or foreseeable) equivalent that cannot be found within the meaning of the language of a claim cannot infringe. This requirement may place too much of an expectation on the drafters of a claim, without giving significantly more guidance on patent scope. Japanese law allows for foreseeable and unforeseeable equivalents by basing its test of interchangeability on the time of manufacture

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of the accused device, but offers another way to narrow application of the doctrine: if the variant employed constitutes an essential part of the claim, then the accused device does not infringe. This requirement has injected much confusion into the application of the doctrine of equivalents in Japan. In contrast, Germany has declared that its test for equivalents be based on a specialist's knowledge at the time of priority, and therefore has established a clear doctrine of equivalents that does not cover unforeseeable equivalents or suffer from other major problems. Should the doctrine of equivalents be broad enough to include unforeseeable equivalents? Is such an inclusion worthwhile if it brings uncertainty to the doctrine, or renders protection too broad? Is foreseeability even the correct line to draw, or should the doctrine focus on an essential/inessential distinction? It is for the reader to answer the question of whether any of these jurisdictions have it right.