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A COMPARATIVE ANALYSIS OF THE DOCTRINE OF EQUIVALENTS: CAN EUROPEAN APPROACHES SOLVE AN AMERICAN DILEMMA?

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I. Introduction

Uncertainty and an "unsettling inconsistency in adjudications" have long characterized American patent litigation. n1 A federal commission notoriously concluded in 1981 that "patent law is an area in which the application of the law to the facts often produces different outcomes in different courtrooms in substantially similar cases." n2

Uncertainty and unpredictability obviously denigrate the very purposes of the patent system. Inventors become uncertain whether the benefits of patent protection are worth the disclosure, cost, and trouble in comparison with alternative means of realizing the benefits of their inventions. Small businesses and investors have difficulty making knowledgeable investment decisions regarding patents they fear may be tied up for years in litigation. Competitors invest huge sums to develop new products or technology, often with the advice of patent counsel, only to be sued for infringing patents they believed were limited to the plain meaning of the English language. The uncertainty of the outcome renders patent litigation expensive, protracted, and burdensome. n3

One perceived source of uncertainty and unpredictability in patent law is the doctrine of equivalents. Originally intended to provide

[*36] inventors with a fair scope of protection for their patents, it has become a powerful means of extending a patent's scope, often in unpredictable ways. The principal problem is that since the Supreme Court's Graver Tank decision in 1950, the doctrine of equivalents has imposed liability for infringement upon an accused device that performs substantially the same function, in substantially the same way, to produce substantially the same result as the claimed invention. n4 The malleability of the term "substantially" permits any good lawyer, on the same set of facts, to construct equally plausible arguments that an accused device either infringes or does not infringe a patent claim in all but the clearest cases. When combined with the fact that equivalence is a fact issue for a jury, n5 the doctrine generally requires a defendant either to submit to the extortion of a settlement demand or defend the case all the way through trial, regardless of the merits of the allegations.

For these reasons, many businessmen, scholars, patent practitioners, and litigants - and some jurists - have called for the death of the doctrine of equivalents. n6 In 1997, however, a unanimous Supreme Court not only refused to kill the doctrine of equivalents, but also withdrew its endorsement of the Graver Tank test as the sole means of determining equivalence. n7 The Court held that the "particular linguistic framework" used to determine equivalence is less important than the fundamental question of whether equivalence really exists. n8 Thus, as the doctrine prepares to enter the twenty-first century, the present members of the Court appear to view equivalence just as Justice Stewart once viewed pornography - they cannot define it, but they know it when they see it. n9

Across the Atlantic, distinguished European jurists, scholars, and diplomats have engaged in a similar task of attempting to identify and define the proper scope of patent protection while harmonizing their respective national patent laws. Two members of the European Union

[*37] are of particular interest: the United Kingdom and Germany. Although they possess two of the oldest and most highly developed patent systems in the world, these countries historically have developed and enforced the most widely divergent views concerning the proper scope of patent protection. n10 The historical development of the British and German patent systems, and recent attempts to harmonize these systems, highlight the clash of interests and policies that characterizes any determination of patent scope.

In this article I will examine the doctrine of equivalents in the United States, and its brethren in the United Kingdom and Germany, from a comparative perspective. First, I summarize the historical development of the doctrine in the United States. Second, I review the historical development of the scope of patent protection in the United Kingdom and Germany. Third, I review the multilateral treaty requirements that have induced European harmonization, comparing British and German efforts to comply with these requirements. Finally, I consider whether and how European approaches can inform American efforts to increase the certainty and predictability of this component of patent law.

II. The United States

A. The History of Equivalents in America

The United States of America has the second oldest patent law in the world. n11 United States patent law originates directly from the U.S. Constitution, which provides in Art. I,

§ that:

The Congress shall have power . . . to promote the progress of Science and Useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.

The patent system was intended to promote the arts and sciences by encouraging inventors to disclose their inventions and by encouraging other people to invest in commercializing these inventions. n12 The system represents a balanced policy. On the one hand, it benefits the public directly by treating a patent as a written contract between the inventor and the state, rather than as a reward to the inventor; the inventor agrees to disclose the invention to the public and the state agrees to grant him or her a limited monopoly concerning the inven-

[*38] tion. n13 On the other hand, it seeks to advance the "useful arts" and serve the public interest indirectly through benefits to inventors. n14 Such benefits encourage invention, encourage investment in patentable inventions, and advance the art during the term of the patent, not merely at its end. This balanced policy has led to a balanced approach to the competing interests of inventors and the public.

Congress passed the first patent legislation on April 10, 1790, followed closely by the Patent Act of 1793. n15 Neither statute provided for claims, but the 1793 Act required the applicant to "deliver a written description of his invention, and of the manner of using, or process of compounding the same, in such full, clear and exact terms, as to distinguish the same from all other things before known" n16 Thus, United States patents did not originally include claims; n17 the fact-finder in an infringement case compared the accused device with the description. n18

Courts subsequently began to interpret the description requirement of the 1793 Act to include statements similar in nature to claims, and applicants began to insert a sentence or two pointing out what they considered to be the invention. n19 By 1836, the practice of using claims had become so customary that Congress codified it. n20 For the first time, an applicant was bound statutorily to "particularly specify and point out the part, improvement, or combination, which he claims as his own

[*39] invention or discovery." n21 Congress strengthened the claiming requirement in 1870 to require that an applicant "particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery" n22 Much of that language remains the same today. n23

The early development of claims profoundly affected the United States patent system. Claims came to serve two purposes: (1) they fulfilled the applicant's bargain with the state by disclosing the invention to the public; and (2) they informed the public what it could and could not do during the patent monopoly. n24 As this notice function developed, courts came to view claims as principally intended to benefit the public. n25 By the mid-nineteenth century, claims had assumed a central role in defining the extent of a patentee's rights:

Some persons seem to suppose that a claim in a patent is like a nose of wax which may be turned and twisted in any direction, so as to make it include something more than, or something different from, what its words express. . . . The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms. n26

The public-notice function of claims had several consequences. First, United States patent practice developed into a "peripheral" system in which an applicant negotiates with the Patent & Trademark Office during prosecution to define the outer limits - the peripheral boundaries - of the patent monopoly. n27 In some sense a patent claim theoretically came to be viewed like a metes-and-bounds property description in a deed. n28

[*40] Second, early courts rejected "patent protection for an inventive concept or for the heart or 'essence' of an invention or for an achieved result." n29 Finally, because claims permitted applicants to define their inventions more specifically, courts began to require that they do so. n30 Thus, in the conflict between the public interest and the inventor's interest, patent claims gave the public the upper hand.

Even as claims assumed their central role in defining the scope of protection, American courts nevertheless recognized that a patent is not a deed and an invention is not a geographical area subject to precise mathematical measurement. n31 A claim must describe an invention in words, which necessarily lends a certain amount of fuzziness to the delimitation of the peripheral boundaries of the invention. n32 Due to the balanced policy supporting the patent system, United States courts could not wholly neglect inventors' interests.

Although infringement by equivalents did not originally exist as a separate concept, the nature of early, one-step infringement tests served to accommodate the fuzziness at the boundaries of an invention. n33 Courts did not require exact correspondence between a patent's description and the accused device; rather, they looked for "mere colorable alterations" n34 or "substantially the same invention." n35

The development of claims, however, necessarily began to narrow the scope of protection available under early infringement tests. Accordingly, in 1853, the United States Supreme Court moved to protect patentees by holding that the scope of protection would encompass a range of equivalents. n36 Courts thereafter began to resolve the scope of a

[*41] patent's protection into two analytically distinct zones: literal infringement and infringement by equivalents. n37

Early equivalence opinions focused upon fleshing out the doctrine. Courts subjected the doctrine of equivalents to the limitations of prior art and "file- wrapper" estoppel, and typically measured the doctrine of equivalents by the significance of the invention. n38 "Pioneer inventions" were entitled to a broad range of equivalents, narrow improvement patents received little or no range of equivalents, and normal improvement patents were accorded something in between. n39 Courts also debated whether the scope of protection should be limited to equivalents known at the priority date or extend to those known on the date of infringement. n40 The Supreme Court initially embraced the former position. n41 Due to the significance accorded to pioneer inventions, however, courts ultimately rejected that requirement: a pioneer invention presumably has no equivalents when invented, and the inventor should benefit from informing the art to the extent of after-developed equivalents. n42

Courts in the United States ultimately balanced these competing policies - protecting the public with claims and protecting inventors with the doctrine of equivalents - by meshing them into the "all-elements rule." The "all-elements rule" requires that, in order for an accused device to infringe a patent claim, the device must possess every element of the claim either literally or equivalently. n43 In other words, if

[*42] the accused device lacks a single claimed element exactly, and it lacks an equivalent for that element, then it does not infringe the patent claim.

The "all-elements rule" represents the balance struck between the public and the inventor in American patent law. Within the operation of the rule, the doctrine of equivalents is permitted free play. Exact one-to-one correspondence between the claimed elements and the elements of the accused device is not required; one element in an accused device can function as the equivalent for two claimed elements, or vice-versa. n44 But the fundamental check on the scope of equivalents is that, to find infringement, every element of the claim must exist, either literally or by equivalents, in the accused device. As the Supreme Court noted:

[T]he courts of this country cannot always indulge the same latitude which is exercised by English judges in determining what parts of a machine are or are not material. Our law requires the patentee to specify particularly what he claims to be new, and if he claims a combination of certain elements or parts, we cannot declare that any one of these elements is immaterial. The patentee makes them all material by the restricted form of his claim. We can only decide whether any part omitted by an alleged infringer is supplied by some other device or instrumentality which is its equivalent. n45

B. Graver Tank Sets Forth "The Test"

The foundation for all modern United States law concerning the doctrine of equivalents is the 1950 case of Graver Tank. n46 The patent at issue claimed an electric welding flux formed, in part, from an alkaline earth metal silicate such as magnesium. The accused flux was virtually identical, except that it contained a silicate of manganese, which was not an alkaline earth metal. Thus, the Court was faced with the issue of whether the substitution of manganese for magnesium - something that was not an alkaline earth metal for something that was - fell within the doctrine of equivalents. n47

The Court explained that to limit the scope of patent protection to the literal scope of the claims would convert a patent into "a hollow and useless thing." n48

Such a limitation would leave room for - indeed encourage - the unscrupulous copyist to make unimportant and insubstantial changes and substitu-

[*43] tions in the patent which, though adding nothing, would be enough to take the copied matter outside the claim, and hence outside the reach of law. It would deprive [the inventor] of the benefit of his invention and would foster concealment rather than disclosure of inventions, which is one of the primary purposes of the patent system. n49

This Court formulated what subsequently became known as the "tripartite" test: an accused device is equivalent if it performs substantially the same function in substantially the same way to yield substantially the same result. n50 The Court also highlighted two fundamental characteristics of an equivalent: (1) the differences between a claimed feature and its equivalent represent an "insubstantial change;" and (2) a claimed element and its equivalent evince "known interchangeability." n51

While the tripartite test represents a significant analytical framework upon which to stretch the doctrine of equivalents, each of its branches nevertheless relies fundamentally upon the language "substantially the same." The tripartite test thereby echoes some of the one-step infringement tests that characterized early American practice and lends less precision than might appear at first glance. Apparently, the Court intended such imprecision:

Equivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum. It does not require complete identity for every purpose and in every respect. In determining equivalents, things equal to the same thing may not be equal to each other and, by the same token, things for most purposes different may sometimes be equivalents. Consideration must be given to the purpose for which an ingredient is used in a patent, the qualities it has when combined with the other ingredients, and the function which it is intended to perform. n52

Within the context of the plaintiff's electric welding flux patent and the pertinent prior art, the Court held that manganese was the equivalent of the claimed alkaline earth metal and that the accused flux infringed the patent. n53 The tripartite test became the test of infringement by equivalents for the next four decades. n54

Most courts thereafter focused on applying the tripartite test to the varied factual circumstances that characterize patent litigation. Over the years, courts have phrased the tripartite test in at least eight ways, all referring generally to substantially the same means (or structure), performing in substantially the same way (or manner or mode of

[*44] operation), to yield substantially the same result (or end function or work). n55 Some courts have applied a four-part test (i.e., employing substantially the same means that performs substantially the same function in substantially the same way and obtains the same result). n56 In cases of method claims, "result" has been replaced by "function," and to measure a composition of matter courts have compared the purpose, quality, and function of ingredients. n57 Thus, the elements of the equivalents test themselves could be substituted with equivalents.

In addition to the test's original subjectivity and unpredictability, additional defects developed. Patent litigants began to dispute what specific function, way, or result characterized the invention or the accused device, with each side advocating the particular function, way, or result that would cause it to win. n58 That situation was exacerbated when some courts ruled that the tripartite test - or at least the "way" portion of it - had to be applied with an element-by-element comparison between the patent claim and accused device. n59 Finally, it became increasingly apparent that the test might not be well suited for evaluating more sophisticated technologies. n60

Although the doctrine entered the 1980s as one of the most powerful tools of judicial discretion in patent law, by the end of the decade it appeared that the United States Court of Appeals for the Federal Circuit might restrict or eliminate it in the interest of more predictable decisions. n61 In *Pennwalt Corp. v. Durand-Wayland, Inc.*, n62 the Federal Circuit resolved the long-running battle about whether equivalence should be measured element-by-element or between the claim and the accused device as a whole. It chose the former, more restrictive comparison. n63

Henceforth, "the term 'equivalents' in the 'doctrine of equivalents' [would refer] to 'equivalents' of the elements of the claim, not 'equiva-

[*45] lents' of the claimed invention." n64 The Federal Circuit subsequently extended that analysis to require a limitation-by-limitation comparison. n65

Following Pennwalt, Judges of the Federal Circuit began to imply, usually in dicta, that infringement by equivalents should be the exception, not the rule; they indicated that the findings of infringement by equivalents might be conditioned upon some sort of equitable threshold. n66 Patent practitioners therefore awaited an announcement of whether, and how, the doctrine of equivalents would enter the twenty-first century.

C. Warner-Jenkinson: The Doctrine of Equivalents for the Twenty-First Century

In 1997, the United States Supreme Court issued the most significant opinion regarding the doctrine of equivalents since *Graver Tank*. In *Warner-Jenkinson*, the Court considered whether to drop the doctrine altogether, whether to limit the doctrine in several ways, and how the test for equivalents should be phrased linguistically. n67

The patent at issue claimed an improved process for the ultrafiltration of dye that operated in a pH range from approximately 6.0 to 9.0. The pH limitation was added during prosecution to overcome a prior art reference that disclosed a process operating above a pH of 9.0. Although such evidence plainly explained the addition of the upper pH limit, there was no conclusive evidence why the applicant added the lower pH limit. The accused device operated at a pH of 5.0. n68

The Court dealt with the first issue - eliminating the doctrine of equivalents - in the first paragraph of its opinion:

Nearly 50 years ago, this Court in *Graver Tank & Mfg. Co. v. Linde Air Products Co.* set out the modern contours of what is known in patent law as the "doctrine of equivalents." . . . Petitioner, which was found to have infringed upon respondent's patent under the doctrine of equivalents, invites us to speak the death of that doctrine. We decline that invitation. The sig-

[*46] nificant disagreement within the Court of Appeals for the Federal Circuit concerning the application of Graver Tank suggests, however, that the doctrine is not free from confusion. We therefore will endeavor to clarify the proper scope of the doctrine. n69

With respect to limiting the doctrine, the Court found that an element-by-element approach would reconcile its two opposing lines of authority - doctrine of equivalents opinions and "all-elements rule" opinions - and would permit a proper range of equivalents without enlarging the scope of protection beyond the claims. n70 It warned that even when applied to an individual element, the doctrine should not be allowed to effectively eliminate the element in its entirety. n71

The Court refused, however, to subject the doctrine to any equitable hurdle or intent requirement. n72 Equivalence arises from identity between a claimed invention and an accused device. If such identity exists, there is no theoretical basis for treating it any differently than literal infringement, in which intent is irrelevant. The Court also refused to limit the doctrine to equivalents disclosed in the patent specification or known on the priority date. n73 A skilled person's knowledge of the interchangeability of a claimed and accused element is analogous to thereasonable-person standard by which courts judge negligent behavior. It merely serves as evidence of the similarities or differences between the claimed and accused elements and therefore is relevant at the date of infringement.

With respect to prosecution history estoppel, the Court established a balanced scheme. If estoppel is asserted against a patentee who amended a claim during prosecution, the patentee is entitled to explain the amendment. n74 If the patentee does so, the court can consider whether the explanation is sufficient to avoid estoppel; in the absence of an explanation, however, the court is entitled to assume that estoppel precludes the doctrine of equivalents. n75

Finally, the Court addressed the issue of exactly how the doctrine of equivalents should be phrased. Unfortunately, however, it provided no answer:

[*47]

In our view, the particular linguistic framework used is less important than whether the test is probative of the essential inquiry: Does the accused product or process contain elements identical or equivalent to each claimed element of the patented invention? Different linguistic frameworks may be more suitable to different cases, depending on their particular facts. A focus on individual elements and a special vigilance against allowing the concept of equivalence to eliminate completely any such elements should reduce considerably the imprecision of whatever language is used. n76

On the basis of these principles, the Court reversed and remanded the case for reconsideration. n77 In sum, a rejuvenated doctrine of equivalents will enter the twenty-first century stronger and less certain than ever. It still must operate within the bounds of the "all-elements rule," prior art, and prosecution history estoppel. It must be applied on an element-by-element basis, but it no longer defines an equivalent element solely with reference to the tripartite test. Equivalence now is measured more broadly by whether the differences between the accused and claimed elements are insubstantial - that is, whether they evince known interchangeability, at the time of infringement, within the context of the patent and prior art.

Although many complained that Graver Tank's tripartite test was uncertain and unpredictable, the scope of patent protection now can be measured in new, different, and still unarticulated ways. Thus, the question arises whether European approaches to the scope of protection can inform future American practice.

III. European Approaches

A. The Traditional British Rule: Strictly Textual Interpretation

George Bernard Shaw once characterized England and America as two countries separated by the same language. Although American patent lawyers are familiar with the terms "literal" infringement and the doctrine of "equivalents," one must learn "textual" infringement and the doctrine of "pith and marrow" when one crosses the Atlantic to practice patent law.

The patent law of the United Kingdom is over 350 years old. n78 The Statute of Monopolies of 1623 is usually cited as the first English statute dealing with patents, but Letters Patent for inventions had been

[*48] granted long before then. n79 In fact, prior to the Statute of Monopolies the granting of monopolies was the rule, not the exception. n80 The crown frequently granted monopolies in trade, production, and import in return for money or services, or simply to show favor. n81 The practice became so prolific and was so detrimental that Parliament passed the Statute of Monopolies to void all existing monopolies and ban the practice of granting them, except in the case of a patent for a "manner of new manufacture." n82 Thus, English patent law actually grew out of a mere exception to a total ban on all other forms of monopoly. n83

The development of claims in the United Kingdom mirrors that in the United States. British patent practice did not at first involve claims, or even specifications. n84 Patents originally included only a recital describing the invention generally. n85 This description was meager, but provided the only source of information about the invention and how to perform it unless the patentee verbally instructed members of the public. n86 In an infringement suit, the jury decided whether the accused device was too close to the patented machine. n87

Because this practice was so inconvenient, the law was changed to require that the patentee, within six months after the patent was granted, "particularly describe and ascertain the invention, and the manner in which it is to be performed." n88 The patent contained a declaration providing that it was void if the description was not filed timely. n89 Subsequently, the Patent Act of 1852 required the applicant to file a provisional description with his or her application, followed by a full specification at a later date. n90

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Inventors nevertheless remained dissatisfied with the application process and began to use claims to assert more control. n91 Where an applicant needed to describe old matter, claims permitted him to point out what was not claimed, thereby decreasing the risk of invalidity due to prior art. n92 Furthermore, juries determined infringement by abstracting the invention into its essential features and looking for those features in the accused device. n93 Claims permitted the inventor to perform that abstraction and thereby retain control over determining the essential elements of the invention. n94

For these reasons, claims became common in the United Kingdom by the nineteenth century. n95 The Patents, Designs and Trade Marks Act of 1883 made claims compulsory. n96 By 1949, the statute required that a specification conclude "with one or more patent claims defining the scope of the invention claimed." n97

The historical origin of British patent practice as an exception to a ban on monopolies caused British policy to lean more heavily toward the interest of the public. Due to the initial lack of substantive patent legislation, courts in the United Kingdom had the discretion to develop patent law as they saw fit, and the strong policy against monopolies caused them to view patents with suspicion. n98 Because a patent applicant sought the exclusive privilege to exercise a particular art, courts considered it fair to expect him or her to specify exactly what the public would be forbidden from doing during the term of the monopoly. n99

Thus, the scope of patent protection in the United Kingdom came to be limited principally to the literal scope of the claims. n100 The effect of disclosing but failing to claim patentable matter usually was to

[*50] dedicate it to the public. n101 As one court noted, "no canon or principle [exists] which will justify one in departing from the unambiguous and grammatical meaning of a claim and narrowing or extending its scope by reading into it words which are not in it. . . ." n102 Literal infringement therefore developed the name "textual infringement," and it typically was an aggrieved patentee's only remedy. n103 Although this practice obviously placed a heavy burden on patent counsel while drafting claims during prosecution, it greatly facilitated subsequent infringement advice due to its large degree of certainty. n104

In rare instances British courts could apply an alternative to "textual" infringement known as the doctrine of "pith and marrow," which defined the scope of patent protection by the substance of the invention. n105 To apply it, a court would examine the description and claim language to identify which elements the inventor considered to be essential and which elements he considered to be inessential; the essential elements constituted the "pith and marrow" of the invention. n106 If an accused device included all the essential elements then it infringed the patent, even if it omitted or contained an equivalent for an inessential element; equivalence was measured by whether the substitute not only produced the same result, but also produced it in the same way. n107 On the other hand, if the device lacked an essential element literally, then it did not infringe.

The "pith and marrow" doctrine plainly de-emphasized equivalence - an accused device that contained all essential elements of a claim would infringe regardless of whether it omitted one or more inessential elements entirely or contained equivalents for those inessential elements. n108 The distinction between inessential and essential elements was of primary importance, because it determined whether the scope of patent protection would extend to equivalents. Thus, British law

[*51] controlled the scope of patent protection principally by limiting the elements that were entitled to any range of equivalence. n109

But the general rule, particularly after the 1949 Patents Act, was that every element and limitation contained in a patent claim was essential. n110 Because patent protection did not extend to equivalents of essential elements, infringement by equivalents remained a very limited exception in the United Kingdom. As one leading authority phrased it, British law gave a "passing nod" in the direction of equivalents. n111

The narrow scope of patent protection in the United Kingdom substantially affected its prosecution practice: applicants drafted and the patent office allowed broader claims phrased in more generalized language. n112 Independent claims, in particular, could be phrased more generally without violating the requirement that they receive sufficient support from the specification. n113 Thus, in the United Kingdom, a narrow scope of protection went hand-in-hand with a broader, more permissive prosecution practice.

B. Traditional German Practice: Claims as a Guideline

Germany's patent practice is nearly as old as those of the United States and the United Kingdom, but its early development was far more fractured. The Holy Roman Empire of the German Nation ended formally in 1806 (although it effectively had ceased to exist in the seventeenth century). n114 In 1815, a German confederation of independent, sovereign states was formed, but it dissolved in 1866 and was replaced by the North German Confederation. n115 The political independence of the constituent elements of those confederations precluded uniform patent legislation until the second German Empire was formed in 1871. n116

[*52] Many of the independent states, however, developed early patent systems: Prussia in 1815; Bavaria in 1825; Wurtemberg in 1828; and so forth. n117

In contrast to the United Kingdom, German patent law historically centered upon protecting the inventor n118 and providing him with a reward commensurate with the extent to which he enriched the art. n119

The first uniform German patent statute came into effect on July 1, 1877. n120 From the date of that Act until the early twentieth century, German courts determined the scope of patent protection from the expressed intentions of the applicant and the patent office. n121 Courts derived that intention by interpreting, under principles of private law, the parties' declarations during prosecution. n122

In some cases, a patentee subsequently sought protection for something that neither he nor the patent office recognized as "the invention" during prosecution. In order to protect the true invention, courts began to resort to a legal fiction of presumptive intent - that is, presuming that the applicant and patent office intended to protect everything in the application that was patentable in light of the prior art. n123 In some circumstances, courts even applied a fictional intent that was contrary to the actual intent expressed by the parties. n124 As late as 1908, however, German courts nevertheless maintained that "the interpretation (of the patent) must not deprive the patent claim of its legal significance of defining the subject matter for which patent protection is sought." n125

In 1910, however, the German Supreme Court, Reichsgericht, made a dramatic decision that expanded the scope of German patent protection decisively in favor of the patentee. n126 In contrast to its language of two years earlier, the court severely restricted the role of patent claims, holding that they were not intended "to delineate

[*53] accurately the scope of patent protection in all its aspects." n127 The expressed intentions of the applicant and patent office were declared to be irrelevant; henceforth, the scope of patent protection would be based solely upon the invention's objective enrichment of the art. n128 German courts would determine the scope of protection purely in light of the state of the art on the filing or priority date. n129 Furthermore, the court not only changed the measurement of the scope of protection, but also changed the party doing the measuring. The former reliance upon the expressed intention of the applicant and patent office meant that the latter had played a decisive role, during prosecution, in determining the scope of patent protection. n130 The 1910 Reichsgericht decision, in contrast, essentially created a dual examination procedure in Germany: the patent office examined the application for inventive quality and fixed the object of the patent; the courts subsequently determined its scope of protection. n131 Thus, German courts made a conscious decision to defer questions of scope of protection until an alleged infringement raised them:

[I]t is generally inexpedient at the stage of granting to determine which features are absolutely essential for patent protection and which may be omitted or which feature of group of features should of itself enjoy patent protection; further investigation of the limits of protection would merely lead to the grant of the patent being unduly delayed. n132

This decision initiated the period of broadest patent protection in Germany. For decades thereafter, a patentee could not know the full scope of protection of a patent until he or she received a judgment in infringement proceedings. Similarly, the public could not rely upon the terms of the claims as a guide to what conduct to avoid on pain of infringement liability. A patentee could file an infringement claim and seek protection for all ideas disclosed in the patent specification to the extent permitted by prior art, regardless of the contents of the claims. n133

At least one court broadened that rule to the stretching point when it stated (in dicta) that patent protection extended to all techniques or other matter taught by the patent specification to those skilled in the

[*54] art. n134 Such a practice understandably required the least amount of precision by patent counsel during prosecution, but placed an onerous burden on counsel attempting to provide infringement advice.

Toward the end of the 1930s, German courts began attempting to make the scope of protection more predictable by imposing an analytical framework with which it could be measured. n135 The courts developed a German "tripartite doctrine," which shared nothing but its name with its American counterpart. Under that doctrine, a patent provided three areas of protection for: (1) the direct subject matter of the invention; (2) the subject matter of the invention; and (3) the general inventive idea. n136

The first part - the direct subject matter - corresponded to the American and British concepts of literal and "textual" infringement, respectively. It represented the technical conception that an average person of skill in the art n137 would form from the literal claim language construed in accordance with the description and drawings. n138 In contrast with the emphasis placed upon literal infringement in the United States and the United Kingdom, in Germany the direct subject matter represented the level of protection accorded to a claim that was fully anticipated, or otherwise invalid, prior to a successful revocation proceeding. n139 The direct subject matter therefore played an insignificant role in German patent law. n140

The second part - the subject matter of the invention - comprised the inventive idea or technical teaching that a skilled person would derive from the claims, without inventive effort, in light of the description, drawings, prior art, and general knowledge available to skilled persons. n141 To identify the subject matter of the invention, a court would analyze the problem and solution underlying the invention and derive the combination of elements that embodied the inventive idea. n142 The scope

[*55] of protection then included at least evident equivalents and inferior embodiments of that subject matter. n143

Equivalence was measured by whether an accused feature had the same technical function as the claimed element and could replace it within the inventive idea for solving the underlying problem. n144 To be an "evident" equivalent, that replaceability had to be immediately evident to the skilled person. n145 The court was not permitted to assess the level of inventiveness or technical advance represented by the patent; such matters were reserved for the patent office and courts addressing revocation proceedings. n146 The subject matter of the invention represented the normal scope of protection accorded to every German patent claim, except claims that were fully anticipated or otherwise invalid. n147

The third part of the German "tripartite" doctrine - the "general inventive idea" - was relevant only where the accused device fell outside the technical teaching of the patent. n148 In such a case the court would examine whether a common inventive idea encompassed both the accused device and the technical teaching of the patent, as evidenced by the claims, description, and drawings. n149 Any such common, inventive idea was termed the "general inventive idea." n150

German courts protected the general inventive idea in order to provide the inventor a monopoly commensurate with the extent to which he or she enriched the art. n151 This protection originated from the requirement that an "invention" possess a general inventive idea in order to receive patent protection. n152 Once courts began to grant patent protection on that basis, it was natural to begin measuring the scope of protection from the scope of the inventive idea rather than from a particular embodiment. n153 For purposes of certainty, a general inventive idea had to satisfy three criteria to receive protection: (1) it had to be deducible by a skilled person from the claims and the accused device; (2) it

[*56] had to be deducible without inventive effort; and (3) it had to satisfy all patentability requirements. n154 Protection of the general inventive idea represented the broadest protection available to German patents.

First, this protection extended to non-evident equivalents - that is, equivalents cognizable to the skilled person after special and detailed, but non-inventive, consideration. n155 As with evident equivalents, a non-evident equivalent had to have the same technical function as the claimed element and be able to replace it within the scope of the inventive idea and the solution principle of the patent. n156 Thus, the distinctions between evident and non-evident equivalents were two-fold, based on (1) the level of consideration required by a skilled person to recognize its replaceability; and (2) the requirement that non-evident equivalents be patentable. n157

Second, protection of the general inventive idea extended to "subcombinations" - accused devices that omitted one or more claimed elements. n158 To receive protection, a subcombination had to present at least some of the advantages of the claimed embodiment, make substantial use of the inventive idea of the patent, and be immediately deducible from the patent specification by a person of skill in the art. n159 The patent specification did not, however, have to identify the subcombination. n160 Subcombination protection could extend to a subset of elements from one or more claims; it could cover a device that omitted some claimed elements and contained evident or non-evident equivalents for others; and it sometimes could extend even to a single element. n161 In the latter instance, it was termed "element protection." n162

Protection for the "general inventive idea" completed the bifurcation of the German patent examination system. Thereafter, the patent office examined an application for inventive quality with respect to only a part of the protection actually available: the subject matter of the invention and evident equivalents. n163 If a patentee desired additional protection, then he or she could file an infringement claim and posit a United States and the United Kingdom, most German scholars believed that the scope of

Despite the obvious breadth of these doctrines in comparison with those of the German patent protection retained a strong connection to the claims because even the allegations. n166

equivalence. n168

skilled person would have to use inventive effort to discern general inventive idea usually comprised some selection of concrete, claimed features. n167 Furthermore, the scope of protection ceased abruptly once a new, expanded scope of protection using the doctrine of general inventive

[*57] individual elements that never became subject to infringement idea. n164 The court would examine that extended scope of protection for to examine the patentability of non-evident equivalents, subcombinations, or by-case examination to be efficient because neither a court nor the patent office had inventive quality. n165 Again, German courts found such a piecemeal, case-

The broad scope historically accorded to German patents, however, gave rise to a much more narrow and specific claiming practice. n169 Because claims were not drafted for the principal purpose of delimiting the scope of protection, applicants were free to draft narrower claims in more specific language to ensure compliance with patentability requirements. The possibility of protection for the

C. The Patent Law of the European Union

general inventive idea precluded such specificity from unduly limiting the scope of Present European Union patent law arose principally from the European Patent protection available in the event of infringement. n170

Convention, which was signed in 1973 and took effect in June, 1978. n171 The European Patent Convention ("EPC") essentially

[*58] created a European patent system, including a European Patent Office. n172 A citizen of any member state can enter the European patent system with a single patent application, designate the member states in which patent rights are desired, and exit with a bundle of patent rights effective in each designated member state. n173

Where possible the EPC makes extensive use of the national patent laws of its members. For example, in a state for which the patent is designated, a European patent has the same effect and confers the same rights as a national patent of that state, and national law determines its infringement. n174 But unlike patent applicants outside the EPC, who can prepare different patent applications for each national system and thereby account for differences of interpretation and scope of protection, EPC applicants receive an identical description and set of claims n175 for enforcement in each national system. n176 Thus, the EPC had to provide European patents with a common basis of interpretation and a common scope of protection in all member states.

Article 69 of the EPC establishes the scope of protection that a European patent is to have in each member state for which the patent is granted: "The 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." n177

The language of Article 69 originated in the Strasbourg Convention of November, 1963. n178 Article 69 is intended to define a median scope of patent protection by relying upon the claims and by permitting them to be interpreted in light of the patent description and figures. n179

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The parties to the EPC attempted to supply some "definition" to Article 69 by agreeing to a Protocol on the Interpretation of Article 69: n180

Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties. n181

The parties widely understood that the Protocol's references to narrow and broad scopes of protection referred generally to those offered respectively by the British and German patent systems. n182

While Article 69 appears relatively straightforward to American patent lawyers, because United States law has long tied the scope of patent protection to the claims n183 and permitted the claims to be interpreted in light of the description and drawings, n184 Article 69 nevertheless gave rise to several issues in Europe. First, in basing the scope of protection upon the claims, Article 69 obviously imposed a very new and limiting doctrine upon patent practitioners in Germany and other European states that have German-derived patent systems. n185

Second, European patent practitioners recognized immediately that Article 69 not only would affect the scope of protection, but would also affect patent prosecution. n186 A narrow scope of protection under Article 69 would necessitate more general and abstract claim language, while a broad scope of protection would permit more specific, concrete claim language. n187 To address such concerns the European Patent Office assured

[*60] practitioners that the Office would conduct prosecution with one eye on Article 69. The Office announced that it would allow functional claims where appropriate, insist upon limitations only where absolutely necessary, and view liberally the support found in the specification for a broad claim. n188

Finally, while Article 69 and the Protocol plainly permit a claim to be construed more broadly than its literal language, they fail to define specifically that breadth. n189 European scholars understandably tend to interpret Article 69 as they would interpret a claim under the national patent system of their home states. n190 British lawyers could find the level of certainty they desired in the strong expression that the scope of protection "shall be determined by the terms of the claims." n191 German patent lawyers, on the other hand, discovered all the breadth they wanted in the distinction between the "terms" of the claims and the claim language: the former suggested the elements one derives by interpretation, the essential content, substance, or core of a claim. n192

The French and German texts of the EPC, which also are authoritative, use the words "tenuer" and "Inhalt," respectively; since each has a slightly different meaning than the English word "terms," translation issues provided additional room for interpretation. n193

European scholars have debated several solutions. On the side of narrow claim construction, some suggested that courts should construe Article 69 as a peripheral claiming system. Under this approach a scope of protection beyond the literal claim language would be the exception, rather than the rule, and available only when necessary to avoid injustice. n194

Two slightly broader proposals would provide claim coverage over an "unmeritorious disguised evasion" or an evident equivalent producing the same result in the same way. n195 Although most scholars agreed that Article 69 should include both types of protection, some debated whether equivalence should be measured at the date of invention or on the date of

[*61] infringement. n196 Fixing the scope of protection on the priority date would maximize certainty, but giving the patentee, who enriched the prior art, the benefit of subsequently derived equivalents would maximize fairness to the patentee. n197

Even equivalents known on the priority date, however, were not free from debate. If an inventor fails to claim an equivalent that really is obvious to the skilled person on the priority date, some argued the public should be entitled to conclude that the inventor deliberately omitted the equivalent from the scope of protection. n198 Others argued that such a conclusion would be proper only where the inventor's intention is clearly evident from the patent description. n199

Some scholars even suggested that the scope of protection under Article 69 should extend to subcombinations, at least if the omitted element does not affect the result of the invention or the way the invention works. n200 But few agreed with such a position. Although one can understand an inventor's failure to foresee all future equivalents of the elements of his claim, his failure to recognize that an element is inessential is more difficult to excuse. n201 Because the inventor knows the elements of his claim, he should reasonably test all possible subcombinations and claim any that are patentable. By the same token, if an element was essential at the date of invention, but was rendered inessential by subsequent invention, then the patentee should not receive the benefit of that subsequent invention. n202

When the World Intellectual Property Organization ("WIPO") grappled with similar harmonization issues, it suggested alternative definitions of equivalence that represented WIPO's view of the American and "new" European approaches. n203 An accused feature would constitute an American-style equivalent if it satisfied the Graver Tank tripartite test. n204 Alternatively, such a feature would constitute an European-style equivalent if "[i]t is obvious to a person skilled in the art that the same

[*62] result as that achieved by means of the element as expressed in the claim can be achieved by means of the equivalent element." n205

Standing atop their respective national patent histories, the United Kingdom and Germany had no shortage of equivalence theories from which to choose. How have each responded to their obligations under the EPC?

D. British Practice After EPC Article 69 and the Protocol

In 1977 the United Kingdom amended its patent legislation to conform to the EPC. n206 The United Kingdom did so, however, without supplying any additional definition to the terms of EPC Article 69 or the Protocol. The burden accordingly fell upon the courts to give substance to such terms.

The House of Lords began that process in the 1982 case of *Catnic Components Ltd. v. Hill & Smith Ltd.* n207 In *Catnic* the House of Lords considered a patent for galvanized steel lintels intended to span the spaces above window and door openings in brick walls. The patent claimed a lintel in the form of a box-girder having a rigid support "extending vertically" from the girder's top to its bottom. The accused device was virtually identical, except that its support was tilted six to eight degrees from the vertical. Although the trial court had found infringement under the doctrine of "pith and marrow," the court of appeals had reversed. n208

Lord Diplock, in whose opinion the other Lords concurred, criticized the historical practice of treating "textual" infringement and the doctrine of "pith and marrow" as separate and independent infringement actions or doctrines. He held that only one test for infringement exists, and this test requires that the patent claim be given a "purposive construction," that is, an interpretation appropriate to a statement

[*63] addressed to those skilled in the art. n209 Where an accused device varies slightly from a particular claim term or phrase, the principal issue is whether a person of skill in the art would understand that the patentee intended strict compliance with that term or phrase to be an essential requirement of the invention such that any variant, even a variant having no material effect on the way the invention worked, would fall outside the scope of the patent protection. n210

Lord Diplock noted that a variant does not infringe a claim unless that variant would have no material effect on the way the invention works and unless that lack of material effect would have been obvious to one of skill in the art on the date the specification was published. n211 Even if both those conditions are satisfied, the variant will not infringe unless it would be apparent to any skilled reader that the patentee could not have intended the particular claim language to exclude such known, minor variants having no material effect. n212

Applying a "purposive construction" to the patent at issue, Lord Diplock concluded that any builder would find obvious, with reference to a component of a lintel, that the patentee could not have intended the phrase "extending vertically" to make exact verticality an essential feature of the invention. n213 Accordingly, the House of Lords found infringement. n214

The following year the Court of Appeals highlighted the seminal role of *Catnic* by opining that prior opinions concerning "textual" infringement and "pith and marrow" would be of little authority and should be avoided by patent counsel. n215 In *Codex Corp. v. Racal-Milgo Ltd.* an alleged infringer attempted to avoid liability by relying upon terms directed at the form of the apparatus, the sequence of the components, or the techniques of the application. n216 But because a reader skilled in the art would not have concluded that such specifics were essential requirements of the invention, the court rejected those arguments. n217 The court applied, instead, the purposive construction mandated by *Catnic* and identified the essential and novel features of the claims as they would

[*64] appear to a skilled reader. n218 The accused device included each such feature, so the court found infringement. n219

The Catnic principles subsequently were reorganized into a cohesive test in *Improver Corp. v. Remington Consumer Products Ltd.* n220 In *Improver* the court faced a patent for an electrical device, marketed under the name "Epilady," intended to remove hairs from the body. The central feature was a helical spring, which was bent into an arc so that its windings spread apart on the convex side and pressed together on the concave side. An electric motor rotated the spring, causing body hair located between the windings on the convex side to be pinched and pulled from the skin as the windings rotated to the concave side and closed. The accused device substituted an elastomeric rod with parallel, concentric slits in its surface in place of the helical spring. Like the spring, the rod was rotated by an electric motor while bent into an arc so that the slits opened on the convex side and closed on the concave side.

The court found that the Catnic principles are applicable when an accused device falls outside the literal scope of a patent claim. n221 The court restated those principles as follows:

1. Does the variant have a material effect upon the way the invention works? (If "yes," then the variant is outside the scope of protection and does not infringe; if "no," then the second question applies.)

2. Would the fact 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," then the variant is outside the scope of patent protection and does not infringe; if "yes," then the final question applies.)

3. Would the reader of skill in the art nevertheless have understood from the claim language that the patentee intended that strict compliance with the primary meaning was an essential requirement of the invention? (If "yes," then the variant is outside the scope of patent protection and does not infringe; if "no," then the patentee presumably intended a figurative meaning denoting a class that includes both the literal meaning and the variant. The variant therefore falls within the scope of patent protection and infringes the claim.) n222

The court clarified that in the second step, determining the obviousness of the lack of material effect, the word "obvious" does not

[*65] connote lack of inventiveness as in a patentability analysis. n223 Rather, the second step assumes that a skilled person on the relevant date is told of both the invention and the variant and asked whether they obviously work in the same way. n224 Thus, even a variant that results from an inventive step can satisfy the second step of the Catnic analysis if the variant obviously works in the same way as the invention.

In applying this test to the "Epilady" patent, the court found that the rubber rod had no material effect on the way the invention worked and that the lack of material effect would have been obvious to a skilled person. n225 With respect to the third question, however, the court held that a skilled reader would be entitled to conclude that the patentee had good reasons for limiting his claim to a helical spring. n226 The court found that an elastomeric rod did not approximate a helical spring in the same way that six to eight degrees from vertical approximates vertical. n227 Furthermore, the helical spring was not inessential and the elastomeric rod was not a minor variant for three reasons: the use of an elastomer involved difficult problems that the invention did not address; the rod could not be used in the same configuration as the spring; and the patentee had performed no research concerning elastomeric rods. n228 Thus, the court found no infringement. n229

British courts clearly consider purposive construction to be the "position between . . . extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties," as required by the Protocol and the Patent Act of 1977. n230 In one sense, however, this "new" British approach appears merely to restate in new language the old doctrines of "textual" infringement and "pith and marrow," despite the protestations of British courts to the contrary.

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As noted in *Improver* a purposive construction is not necessary if the accused device falls within the literal scope of the claim language. n231 Thus, the old doctrine of "textual" infringement appears to be alive and well. Where the accused device falls outside the literal scope of the claims, purposive construction seems to retain the pith and marrow of the old "pith and marrow" doctrine, while reversing the sequence of the steps. The first two steps of purposive construction, ensuring the lack of material effect on the way the invention works and the obviousness of that fact, serve to confirm obvious mechanical or functional equivalence between the variant and the invention. n232 The "pith and marrow" doctrine similarly measured the equivalence of variants of inessential elements. n233 The final step of purposive construction determines whether the claimed feature at issue is an essential or inessential element, which used to be the first step of the "pith and marrow" doctrine. n234 Thus, one could question whether British courts really have adopted a theoretically broader scope of patent protection.

On the other hand, British practice historically controlled the scope of protection, not through the scope of equivalents, but by limiting the number of claimed elements that were subject to any equivalent substitutions. By reversing the sequence of the analysis, courts appear to have increased subtly the instances in which a claimed element will receive a range of equivalents. When applying an old "pith and marrow" analysis, courts first asked what claim elements were essential; the usual answer, of course, was "every element," thus precluding any range of equivalents. n235 In contrast, purposive construction leaves that question to the end, until after a court already has examined the lack of material effect and obvious equivalence of the substitute feature in the accused device. n236 Thus, the question now is whether the applicant intended to exclude even "minor variants which, to the knowledge of both him and the readers to whom the patent was addressed, could have no material effect upon the way in which the invention worked." n237 A court should find it more difficult to answer that question in the affirmative.

Finally, the mere announcement of a "new" test for determining the scope of patent protection, phrased in new language, appears to have

[*67] encouraged courts to give effect to an increased scope of protection. For example, in *Kastner v. Rizla Ltd.*, n238 the Court of Appeal considered a patent that claimed an apparatus for making packets of interleaved cigarette papers. The claimed invention included a knife mounted on a movable knife plate that was carried by a platform. The knife plate reciprocated perpendicular to the direction in which the cigarette papers traveled so the knife could cut them; the platform simultaneously reciprocated in the same direction and at the same speed as the cigarette papers in order to provide a straight, clean cut. A pusher plate, used to displace the cigarette papers laterally after cutting, was carried by and movable with the knife plate.

The accused device differed from the claimed invention in two pertinent ways. First, the accused knife was a crescent-shaped blade mounted in a rotary fashion. Second, the pusher plate was operated by a system of cams rather than by the motion of the knife. The trial court had found that the accused device did not infringe because it lacked (1) a knife that reciprocated on its axis towards and away from the cigarette papers, and (2) a pusher plate carried by and movable with the knife. n239

The Court of Appeals confirmed again that the purposive approach articulated in *Catnic* meets the Protocol and Patent Act of 1977. n240 With respect to the accused rotary knife, the court found that it achieved the claimed motion when the claim was construed purposively. n241 With respect to the accused pusher plate, the court held that its mechanical differences did not materially affect the way it performed its function in the apparatus, and that the lack of material effect would be obvious to a skilled person once that skilled person substituted a rotary knife for the reciprocating knife. n242

Finally, the court found a skilled person would conclude that the claimed operation of the pusher plate was not an essential requirement of the invention. n243 The court relied upon four factors: (1) the invention's title suggested that the inventive step concerned the interleaving and cutting of cigarette papers; n244 (2) the description was intended to overcome disadvantages of prior art machines in interleaving and cutting

[*68] cigarette papers; n245 (3) the specification described the invention as two major assemblies, one for interleaving cigarette papers and one for cutting them; n246 and (4) the description of the pusher plate did not indicate any necessity for the plate to operate according to any particular principle. n247 Thus, the court concluded that the operation of the pusher plate in displacing cut cigarette papers was incidental to the invention, such that the scope of protection extended to equivalents. n248 Accordingly, the court found infringement. n249

At least one patent practitioner has opined that Kastner represents "the first occasion . . . in which features so explicitly set out in a claim have been disregarded when that claim is interpreted, and in which a U.K. court has been prepared to substitute its own technical analysis of the proper scope of the invention for that provided in the main claim." n250 Thus, while British doctrine has not yet arrived on the shores of the happy median envisioned by the Protocol, the doctrine at least has set sail and departed from the strictly literal tenets of its past.

E. German Practice After EPC Article 69 and the Protocol.

Even before the EPC was signed, Germany commenced a study of whether German patent practice could be maintained in light of the provisions of the Strasbourg Treaty, n251 described above. The study concluded that change would probably be necessary. n252 Once EPC Article 69 and the Protocol took effect, some German scholars suggested that these provisions were incompatible with the concept of "general inventive concept." n253 Others attempted to subdivide that concept into constituent parts - non-evident equivalents protection, subcombination protection, and element protection - and to analyze each part independently for compatibility with the new treaty requirements. n254

Opinion, however, remained divided between those who believed the

[*69] scope of German patent protection would have to be narrowed and those who believed it was just about right. n255

In 1981 a comprehensive new German Patent Act was published, representing the culmination of the formerly ad hoc process of adapting German patent law to the Strasbourg Convention and the EPC. n256 As was the case in the United Kingdom, the German legislation established the scope of patent protection in accordance with Article 8 of the Strasbourg Convention, EPC Article 69, and the Protocol, but left the courts to supply the necessary definition. n257

The opportunity to do so came in 1986 when the Federal Supreme Court of Germany considered a patent granted under the new statutes. In Formstein (Moulded Curbstone) n258 the invention at issue was a molded curbstone for use along the edges of a roadway. The claimed curbstone contained an integral longitudinal trough, which served as a drainage channel parallel to the road, and a cross-channel connecting the trough to the far side of the curb, which served to drain water from the trough. The alleged infringer was a town that used traditional paving stones to form a road surface and traditional curbstones to form the curbs; it simply laid the curbstones three centimeters apart in order to provide gaps for lateral drainage. The trial court had found infringement but the court of appeals had reversed. n259

The Supreme Court agreed that the town had not literally infringed the patent. n260 The claim language, specification, drawings, and embodiments demonstrated that the longitudinal trough and cross-channel of the invention had to be molded into the stone. Because the accused curbstones were not molded, had no integral trough, and had no integral cross-channel, they did not literally infringe the patent. n261

But the Supreme Court reversed the finding of non-infringement by equivalents. n262 The Court acknowledged that claims "are now not merely the starting point but rather the standard basis for determining the extent of protection." n263 But because the Protocol clearly does not limit

[*70] the scope of protection to the literal language of the claims, "[t]he way is therefore open to determine the extent of protection in a manner that goes beyond the wording of the claims so as to include modifications of the invention described in the claims." n264

To determine the extent of protection beyond the literal claim language, the Court relied upon a person skilled in the art:

What must be asked is: whether a person skilled in the art, has managed, on the basis of the invention protected by the claims, to solve the problem solved by the invention using methods which . . . lead to the same result. Solutions which a person of normal skill in the art, on the basis of the invention described in the claims, and with the aid of his specialist knowledge, can discover to have the same effect will ordinarily be within the protection of the patent. The adequate remuneration of inventors requires this, as does the requirement for the legal certainty. n265

Thus, for the scope of protection to cover an accused device, identity must exist between the device and the invention with respect to the problem and the result or effect; but the solution principle - the way the device works - need not be identical. n266 In examining the solution, one must look not at the literal terms of the specification but at "what technical problem is actually (objectively) solved by the invention in a manner recognisable by a person skilled in the art." n267 The range of equivalents will include all methods or solutions that achieve the same effect as the claimed invention and are discoverable by one of skill in the art from the claims, specification, and drawings. n268

The Court also established an important limitation on the scope of equivalents. The Court held, for the first time in Germany, that an alleged infringer can raise, as a defense to infringement by equivalents, the fact that the accused device is within the prior art or obvious in view of that prior art. n269 Such a defense remains unavailable to a claim of

[*71] literal infringement. n270 The Supreme Court accordingly remanded the case for further consideration. n271

Formstein plainly represents a significant step in narrowing the scope of patent protection in Germany. The scope of protection now is tied explicitly to the claims, and in addition to the traditional policy of adequately compensating the inventor, the court expressed the policy of certainty established by the Protocol. The concept of literal infringement appears to have assumed a slightly larger role than it historically served. The Court limited the scope of equivalents by creating a new defense for accused devices that fall within or are obvious in light of the prior art. Finally, the Court essentially adopted a modified combination of the old German doctrines of evident and non-evident equivalents: it retained the role of the skilled person in determining equivalence; it retained the requirement that an equivalent achieve the same effect in terms of the inventive idea for solving the problem; however, the Court dropped the distinction between the amount of consideration required by the skilled person to discover the equivalent.

Yet Formstein just as plainly permits a broader scope of patent protection than the purposive construction of *Catnic*. *Catnic* immediately excludes from protection those variants having a material effect on the way the invention works. Formstein, in contrast, does not require identity between the ways in which the invention and equivalent work; Formstein instead requires that the equivalent solve the same problem using methods that lead to the same result and that the result be discoverable from the claims, specification, and figures by one of skill in the art. n272 Thus, not surprisingly, conflicts have appeared concerning the scope of protection granted to EPC patents in the United Kingdom and Germany.

One such conflict arose from the EPC patent for the "Epilady" device. As described above, when a British court construed that patent purposively, the court concluded that (1) Remington's substitution of a rubber rod did not materially affect the way the invention worked, n273 (2) that fact would be obvious to a skilled person at the pertinent time, n274 but (3) the skilled person was entitled to conclude that the applicant intended

[*72] strict compliance with the claim language to be an essential feature of the invention. n275 Accordingly, infringement was denied in the United Kingdom.

Unfortunately, a German court of appeals concluded that exactly the same accused device infringed exactly the same patent. n276 Like the British court, the German court found that an elastomeric rod was equivalent to a helical spring within the context of the patent claim because the rod had the identical effect. n277 The court also acknowledged that identity of effect, alone, is insufficient to place an equivalent within the scope of patent protection mandated by EPC Article 69 and the Protocol. n278 A skilled person must be able to determine from the claims, on the basis of his or her professional knowledge on the priority date, that the accused means is "identical in effect for solving the problem underlying the invention." n279

The court found that a skilled person would recognize the "Epilady" patent did not claim a helical spring for ordinary purpose or use - that is, as a spring. n280 The skilled person thus would search for the particular, atypical characteristics for which the helical spring was claimed in the patent. Once the skilled person identified and abstracted those characteristics, an elastomeric rod with radial slits obviously would provide the same characteristics and achieve the same effect as the claimed invention. Thus, the court held that the Remington device infringed the "Epilady" patent. n281

The "Epilady" episode demonstrates that Europe's harmonization of its patent laws is not yet a reality. A small gap still remains that permits conflicting infringement decisions in close cases of equivalence. Nevertheless, the United Kingdom and Germany have departed firmly from their prior polarized positions and are on course to achieve the scope of protection that Article 69 and the Protocol mandate.

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IV. Comparing the American and European Approaches

The United States plainly cannot look to the United Kingdom or Germany for a neatly wrapped, certain, and predictable means of measuring the scope of patent protection. Neither the United Kingdom nor Germany has yet fully settled upon or defined the precise scope of protection that each wishes to offer to inventors, or that complies fully with the EPC. The United Kingdom's and Germany's laudable efforts nevertheless serve to illustrate several crucial concepts to those who wish to bring certainty and predictability to the doctrine of equivalents in the United States.

A. The Scope of Patent Protection Is Not an Independent, or Independently Adjustable, Component of a National Patent System.

American jurists, scholars, and patent practitioners who criticize the doctrine of equivalents tend to assume that the doctrine exists in a vacuum, without ties to other components of the patent system, such that the doctrine can be adjusted or eliminated without collateral effects. To the contrary, the analysis presented above demonstrates that the scope of protection afforded to a patent by a national patent system is not a historical accident. Rather, the scope of protection can be traced directly to the national policies upon which the patent system is built. The scope of protection is intimately intertwined with those policies and with other components of the patent system, such as the scope of claims submitted and allowed during prosecution. Therefore, one cannot adjust the scope of protection without considering and accounting for the effects of such a change on other components of the system.

The United Kingdom formed its patent system from a mere exception to a broad ban on monopolies. Its patent system developed with a policy of viewing such monopolies critically in order to protect the public interest; the system accordingly developed a very narrow scope of protection, limited principally to the literal scope of the claims. n282 Although the system burdened patent practitioners during prosecution, it provided a maximum of certainty to the public when attempting to estimate the scope of activity precluded by the monopoly. To meet Article 69 and the Protocol, the United Kingdom has had to account more for the interests of inventors.

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Germany, in contrast, built its patent system upon a policy strongly favoring recompense for the patentee. The German patent system accordingly developed a very broad scope of protection that encompassed embodiments derived from the inventor's more intangible contributions to the prior art. n283 Although the system limited the public's ability to predict a patent's scope of protection, the system fulfilled German policy of ensuring that each inventor was rewarded for his full contribution to the prior art. n284 Following EPC Article 69 and the Protocol, Germany has had to adjust its practice to account more for the public interest, as is illustrated by the German Federal Supreme Court's frequent references, since Formstein, to the policy of certainty.

United States patent practice recognized the interests of both inventors and the public. Because the U.S. patent system has attempted to balance those interests, it developed a median scope of patent protection. The British and German experiences strongly suggest that a significant adjustment in the scope of patent protection will necessitate a concomitant shift in policy. Thus, in order to jettison or significantly narrow the doctrine of equivalents, as many in the United States have advocated, n285 one must accept a sharp shift in the historical American balance of interests away from the interests of inventors.

Similarly, the scope of protection offered by a particular national patent system is tied to that system's prosecution practice, particularly in the drafting and allowance of claims. As the United Kingdom developed a restricted scope of patent protection, it simultaneously developed a practice of allowing broader claims phrased in more generalized language.

Germany's broad scope of protection, in contrast, generated a practice of narrower and more specific patent claims. When the EPC mandated a median scope of protection between that of the United Kingdom and Germany, practitioners insisted that the European Patent Office account for the different scope of protection during prosecution. n286

Just as the United States has developed a median scope of protection, it also has developed a practice of allowing a median scope of claims. The European experience demonstrates that any attempt to narrow significantly the scope of patent protection, as by significantly narrowing or wholly eliminating the doctrine of equivalents, must be accompanied by an increase in the scope of claims allowed during prosecution. To reduce the scope of protection without adjusting the

[*75] breadth of permissible claim language would risk the vitality and objectives of the patent system as a whole. If claim language were not permitted to broaden intentionally, claim language probably would broaden gradually due to the increased pressure upon patent practitioners to achieve the broadest literal scope of protection. Thus, uncertainty concerning equivalence might be replaced, at least in part, by the uncertainty of broader claim language.

B. The European Union Has Decided to Adopt a Scope of Protection Approximating That of the United States.

The members of the European Union have focused for more than thirty years upon determining the scope of protection that best serves the purposes of the patent system and best balances the competing interests of inventors and the public. The members selected in Article 69 and the Protocol a scope that corresponds roughly to the median scope of protection provided by the American system: a scope based upon the claims interpreted in light of the description and drawings; a scope that falls between a strict, literal interpretation of the claims and a mere use of the claims as a guideline; a scope that "combines a fair protection for the patentee with a reasonable degree of certainty for third parties." n287 Although European states in general, and the United Kingdom and Germany in particular, define or measure that scope of protection differently from each other and from the United States, the European states are working hard to achieve the extent of protection already granted by the United States patent system.

Those who suggest American patent claims should extend no further than their literal terms should examine the British experience. The United Kingdom has the oldest and one of the most highly developed patent systems in the world. Until the 1980s, the British patent system also offered the narrowest scope of patent protection available from a European nation, a system that truly embodied, to the extent practically possible, a literal scope of protection. n288 Despite the certainty offered to the public, however, the United Kingdom now has abandoned that system in order to accommodate European harmonization and the interests of inventors. n289

The fact that such European states have chosen to adopt a scope of protection equivalent to that of the United States suggests strongly

[*76] that American jurists, scholars, and patent practitioners should refocus their efforts to increase the certainty and predictability of patent infringement doctrines. Rather than attempt to supply certainty by changing the scope of protection, scholastic efforts instead should concentrate on defining more precisely and predictably the scope of protection that already exists.

C. The European Experience Suggests Two Means of Narrowing the Scope of Protection, But Offers No More Certain Means Of Defining That Scope of Protection.

The United Kingdom traditionally controlled and measured its scope of patent protection less by the range of equivalents it allowed than by the range of claimed elements entitled to any scope of equivalents at all. n290 A patentee seeking broader protection fought the battle on the field of essential and inessential elements, because patent protection extended only to equivalents of the latter. n291 The patent owner usually lost that battle because the British system generally treated every claimed element as essential. n292 When the patent owner won, however, courts generally measured equivalence by whether the accused feature produced the same result in the same way. n293

In response to the EPC, British courts have attempted to broaden the scope of patent protection in the United Kingdom. They have done so principally by lowering subtly the burden of establishing that a particular element is entitled to a range of equivalents. The range of equivalents, however, remains substantially the same: an accused feature is equivalent if it would not materially affect the way the invention works and if that lack of material effect would be obvious to a skilled person on the priority date. n294

The U.S. patent system typically grants a range of equivalents to every element of a claim. n295 In that sense, the United States patent system is broader than either the traditional or the new British practice. Where the British system permits equivalents, it tends to define them

[*77] much as the United States defines them, with reference to identity between the ways in which the claimed feature and the equivalent work from the point of view of a skilled person. n296 The systems differ, however, with respect to the date on which that comparison is performed: the United States measures equivalence on the date of infringement, n297 while the United Kingdom insists upon obvious equivalence as of the priority date. n298

The traditional scope of protection in Germany went far beyond the literal scope of the claims. Protection of the subject matter of the invention and the general inventive idea extended to evident and non-evident equivalents, that is, equivalents that were evident to a skilled person either immediately or after special and detailed consideration, respectively. n299 An equivalent was defined as an accused substitute feature that had the same technical function as the claimed element and could replace the claimed element while fitting within the inventive idea for solving the problem. n300 Protection for the general inventive idea also extended to subcombinations and individual elements in some circumstances. n301

Germany has narrowed its scope of patent protection by eliminating protection of much of the general inventive idea. An accused device now is equivalent if it achieves the same effect as the claimed invention and is discoverable by a skilled person from the claims, specification, and drawings. n302 Identity must exist between the invention and accused device with respect to the problem and the result or effect, but not with respect to the way they work. n303 Prior art now serves as an important limitation on the scope of equivalents and, like the United Kingdom, Germany requires obvious equivalence as of the priority date. n304

The American "all-elements" rule precludes any subcombination or element protection as was available traditionally in Germany. The new German practice of requiring identity of problem and result or effect

[*78] appears roughly parallel to the first and third branches of the American tripartite test: substantially the same function and substantially the same result. American courts repeatedly have recognized, however, that those two branches of the test rarely present significant issues in infringement litigation; the principal limitation on the doctrine of equivalents is the "way" branch of the test. n305 Because German law does not require identity between the invention and accused device with respect to the "way" they work, German law defines a broader range of equivalents. n306 But German practice is narrower in one respect: German practice requires equivalence on the priority date. n307

Thus, European practice illustrates two means by which the United States can attempt to inject more certainty and predictability into its patent law.

First, the United States could require obvious equivalence on the priority date. In light of the Court's ruling in Warner-Jenkinson, however, this appears to be an unlikely option. Furthermore, the choice of date on which to examine equivalence appears to be a policy decision relating more to the scope of protection than to its definition. In the view of the author, such a requirement more likely would present an additional issue for expert argument than supply additional certainty or predictability to American patent litigation.

Second, the United States could adopt a British-style concept of denying any range of equivalents in circumstances where a skilled reader would conclude that the inventor intended strict compliance with the literal claim language to be an essential requirement of the invention. In American terms, the effect of such a principle would be to deny patent protection over an equivalent, accused feature that evinces insubstantial differences and known interchangeability with the claimed counterpart. At present, American courts use prior art and prosecution-history estoppel to deny infringement by equivalents in such circumstances. Although the British doctrine would reduce further the scope of patent protection in some circumstances, it appears less certain and less predictable than those American doctrines, which rely upon explicit prior art references or statements by the patentee. Thus, neither the United Kingdom nor Germany presently can offer the United States a more certain or predictable way to measure the scope of patent protection in the United States.

[*79]

V. Conclusion

The historical development of the national patent systems of the United Kingdom and Germany, and their recent attempts at harmonization, present a case study in the concepts and interests involved in determining a proper scope of patent protection. A comparative analysis of those systems and United States practice has yielded three significant results. First, the analysis illustrates that the present scope of patent protection in the United States results from the historical American practice of balancing the interests of inventors and the public and is intimately connected with the scope of claim-drafting during prosecution. Those who would tamper significantly with the present scope must be prepared to address a fundamental shift in patent policy and a fundamental change in prosecution practice. Second, the analysis illustrates that the present scope of United States patent protection probably is just about right, in that nations with highly developed patent systems at both ends of the spectrum are abandoning their historically polarized doctrines for the American middle. Efforts to achieve increased certainty and predictability in American patent law should focus upon defining the present scope of protection more precisely rather than upon narrowing the scope of protection. Finally, the analysis illustrates that although the doctrine of equivalents in the United States does inject some uncertainty into patent infringement practice, this doctrine is no less certain or predictable than similar doctrines developed and still under construction at great intellectual effort in Europe.

n1 H. R. Rep. No. 97-312 (1981), reprinted in 9 Donald S. Chisum, *Chisum on Patents App. 21-7* (1998).

n2 *Id.* at App. 21-7 App. 21-8.

n3 *Id.* at App. 21-9 App. 21-10.

n4 *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 85 U.S.P.Q. (BNA) 328 (1950).

n5 See, e.g., *id.* at 609, 328 U.S.P.Q. at 331 ("A finding of equivalence is a determination of fact."); *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1110, 2 U.S.P.Q.2d (BNA) 1826, 1833 (Fed. Cir. 1987) ("[I]nfringement by the doctrine of equivalents, as well as noninfringement by the reverse doctrine of equivalents, are both questions of fact reviewable under the clearly erroneous standard.").

n6 See *infra* notes 58-61, 66 and accompanying text.

n7 See *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 41 U.S.P.Q.2d (BNA) 1865 (1997).

n8 *Id.* at 40, 41 U.S.P.Q.2d at 1875.

n9 See *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring).

n10 See *infra* Section III, A & B, pp. 13-23.

n11 Jan Voj cek, A Survey of the Principal National Patent Systems 114 (1936).

n12 See Arnold & Lynch, Infringement of Inventions, The John Marshall Law School 28th Annual Conference: More Developments In Intellectual Property Law (1984).

n13 Fred H. Rhodes, Patent Law for Chemists, Engineers, and Executives 3 (1931).

n14 *Whitney v. Emmett*, 29 F. Cas. 1074, 1082 (C.C.E.D. Pa. 1831) (No. 17,585).

n15 Voj cek, supra note 11, at 114; 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, 674 nn.1-2 (1989).

n16 Patent Act of 1793, ch. 11, 3, 1 Stat. 318 (1793), reprinted in 9 Chisum, supra note 1, at App. 10-2; see also *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 957, 4 U.S.P.Q.2d (BNA) 1737, 1753 (Fed. Cir. 1987) (en banc); Adelman & Francione, supra note 15, at 674 nn. 1-2.

n17 For example, the patents at issue in *Reutgen v. Kanowrs*, 20 F. Cas. 555, 556 (C.C.D. Pa. 1804) (No. 11,710) (1796 patent) and *Odiorne v. Winkley*, 18 F. Cas. 581 (C.C.D. Mass. 1814) (No. 10,432) (1799 and 1807 patents did not mention claims). See also Robert M. Meeks, Note, Metaphors of Infringement and Equivalence: The Solution of Our Problems, 2 J. Intell. Prop. L. 279, 285 (1994).

n18 *Pennwalt*, 833 F.2d at 957-58, 4 U.S.P.Q.2d at 1758 (Newman, J. commentary).

n19 See *Lowell v. Lewis*, 15 F. Cas. 1018, 1020 (C.C.D. Mass. 1817) (No. 8,568) (holding that patent is void if its description "mixes up the old and the new, and does not distinctly ascertain for which, in particular, the patent is claimed . . ."); *Whitney*, 29 F. Cas. at 1075; Adelman & Francione, supra note 15, at 674.

n20 Adelman & Francione, supra note 15, at 674 n.2.

n21 Patent Act of 1836, ch. 357, 6, 5 Stat. 117 (1836) (emphasis added), reprinted in 9 Chisum, supra note 1, at App. 11-3.

n22 Patent Act of 1870, ch. 230, 26, 16 Stat. 198- 217 (1870), reprinted in 9 Chisum, supra note 1, at App. 14-6.

n23 35 U.S.C. 112, P 2 (1994) now provides that the specification "shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."

n24 Adelman & Francione, supra note 17, at 675; John B. Waite, Patent Law 186-187 (1920); *Pennwalt Corp. v. Durand- Wayland, Inc.*, 833 F.2d 931, 949, 4 U.S.P.Q.2d (BNA) 1737, 1751 (Fed. Cir. 1987) (en banc) (Nies, J., additional views).

n25 Waite, supra note 24, at 187.

n26 *White v. Dunbar*, 119 U.S. 47 (1886).

n27 Joseph F. Haag, Comment, Hilton Davis Chemical Co. v. Warner-Jenkinson Co.: An Equitable Solution to the Uncertainty Behind the Doctrine of Equivalents, 80 Minn. L. Rev. 1511, 1514 (1996).

n28 Michael D. Bednarek & Jeffrey L. Thompson, Strategies for Maximising Protection under an Evolving Doctrine of Equivalents, 4 E.I.P.R. 237, 237 (1996).

N29 *Pennwalt*, 833 F.2d at 949, 4 U.S.P.Q.2d at 1751 (Nies, J., additional views).

n30 Haag, supra note 27, at 1516.

n31 Bednarek & Thompson, supra note 28, at 237.

n32 Id.

n33 *Pennwalt*, 833 F.2d at 958, 4 U.S.P.Q.2d at 1758 (Newman, J., commentary).

n34 Id. (citing *Odiorne v. Winkley*, 18 F. Cas. 581, 582 (C.C.D. Mass. 1814) (No. 10,432)).

n35 Id. (citing *Lowell v. Lewis*, 15 F. Cas. 1018, 1021 (C.C.D. Mass. 1817) (No. 8,568)); see also *Reutgen v. Kanowrs*, 20 F. Cas. 555, 556 (C.C.D. Pa. 1804) (No. 11,710) ("an improvement on the principle, or the form, or proportions" of the patented invention); *Gray v. James*, 10 F. Cas. 1015, 1016 (C.C.D. Pa. 1817) (No. 5,718) ("formal differences"); see generally Meeks, supra note 17, at 286.

n36 *Winans v. Denmead*, 56 U.S. (15 How.) 330, 343 (1853); see also *Pennwalt*, 833 F.2d at 946, 4 U.S.P.Q.2d at 1749; Meeks, supra note 17, at 287-89; Haag, supra note 27, at 1519.

n37 See, e.g. *Ethicon Endo-Surgery, Inc. v. United States Surgical Corp.*, 149 F.3d 1309, 47 U.S.P.Q.2d (BNA) 1272 (Fed. Cir. 1998); *Flint Kote Co. v. Armstrong Cork Co.*, 321 F. Supp. 22, 169 U.S.P.Q. (BNA) 165 (S.D.N.Y. 1970); *Nachman Spring-Filled Corp. v. Kay Mfg. Co.*, 139 F.2d 781, 59 U.S.P.Q. 349 (BNA) (2d Cir. 1943); *Reece Buttonhole Mach. Co. v. Globe Buttonhole Mach. Co.*, 61 F. 958 (1st Cir. 1894).

n38 Waite, supra note 26, at 279-283.

n39 Id. at 280.

n40 The same debate has been revisited periodically. See, e.g., *Warner-Jenkinson*, 520 U.S. 17, 37, 41 U.S.P.Q.2d (BNA) 1865, 1874.

n41 *Gould v. Rees*, 82 U.S. (15 Wall.) 187, 193; *Rowell v. Lindsay*, 113 U.S. 97, 102 (1885).

n42 *Edison Elec. Light Co. v. Boston Incandescent Lamp Co.*, 62 F. 397, 398 (C.C.D. Mass. 1894); Courts continue to hold that the equivalence of claimed and substituted elements is measured at the date of infringement. See *Warner-Jenkinson*, 520 U.S. at 37, 41 U.S.P.Q.2d at 1874.

n43 See *Union Paper Bag Mach. Co. v. Murphy*, 97 U.S. (7 Otto) 120 (1877); *Water-Meter Co. v. Desper*, 101 U.S. (11 Otto) 332 (1879). See also *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 949-50, 4 U.S.P.Q.2d 1737, 1752 (Fed. Cir. 1987) (en banc).

n44 See *Union Paper Bag*, 97 U.S. (7 Otto) at 123.

n45 *Water-Meter Co.*, 101 U.S. (11 Otto) at 337.

n46 *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 85 U.S.P.Q. (BNA) 328 (1950).

n47 *Id.* at 609, 85 U.S.P.Q. at 331.

n48 *Id.* at 607, 85 U.S.P.Q. at 330.

n49 *Id.*

n50 *Id.* at 608, 85 U.S.P.Q. at 330.

n51 *Id.* at 609, 85 U.S.P.Q. at 331.

n52 *Id.*, 85 U.S.P.Q. at 330-31.

n53 *Id.* at 612, 85 U.S.P.Q. at 332.

n54 Bednarek & Thompson, *supra* note 28, at 238.

n55 Arnold & Lynch, *supra* note 12..

n56 See *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1363, 219 U.S.P.Q. (BNA) 473, 482 (Fed. Cir. 1983).

n57 Stephen M. Bodenheimer, Jr., & John Beton, *Infringement by Equivalents in the United States and Europe: A Comparative Analysis*, 3 E.I.P.R. 83, 85 (1993).

n58 Bednarek & Thompson, *supra* note 28, at 238.

n59 Bodenheimer & Beton, *supra* note 57, at 84.

n60 Bednarek & Thompson, *supra* note 28, at 238.

n61 Thomas K. Landry, *Certainty and Discretion in Patent Law: The On Sale Bar, The Doctrine of Equivalents, and Judicial Power in the Federal Circuit*, 67 *S. Cal. L. Rev.* 1151, 1193 (1994).

n62 833 F.2d 931, 4 U.S.P.Q.2d (BNA) 1737 (Fed. Cir. 1987) (en banc).

n63 *Id.* at 935-39, 4 U.S.P.Q.2d at 1740-43.

n64 *Id.* at 953, 4 U.S.P.Q.2d at 1754 (emphasis added).

n65 Landry, *supra* note 61, at 1194 & n.221.

n66 See Gary M. Hoffman & Eric Oliver, *The Doctrine of Equivalents Goes Back to its Roots (with a View to the Future)*, 2 E.I.P.R. 103, 103 (1996); Landry, *supra* note 61, at 1194-1203; Bednarek & Thompson, *supra* note 28, at 238; Haag, *supra* note 27, at 1524-26; see, e.g., *International Visual Corp. v. Crown Metal Mfg. Co.*, 991 F.2d 768, 774-75, 26 U.S.P.Q.2d (BNA) 1588, 1593 (Fed. Cir. 1993) (Lourie, J., concurring).

n67 *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 41 U.S.P.Q.2d (BNA) 1865 (1997). The Court declined to take up formally the issue of withdrawing the doctrine of equivalents from the jury. *Id.* at 39, 41 U.S.P.Q.2d at 1875.

n68 *Id.* at 23, 41 U.S.P.Q.2d at 1868.

n69 *Id.* at 21, 41 U.S.P.Q.2d at 1868.

n70 *Id.* at 29, 41 U.S.P.Q.2d at 1871.

n71 Id.

n72 *Id. at 36, 41 U.S.P.Q.2d at 1874.*

n73 *Id. at 37, 41 U.S.P.Q.2d at 1874.*

n74 *Id. at 33, 41 U.S.P.Q.2d at 1873.*

n75 Id.

n76 *Id. at 40, 41 U.S.P.Q.2d at 1875.*

n77 *Id. at 41, 41 U.S.P.Q.2d at 1876.*

n78 Voj cek, *supra* note 11, at 95.

n79 Id.

n80 Id.

n81 Id.

n82 *Id. at 97; see also Robert Frost, Patent Law & Practice 1 (4th ed., 1912).*

n83 *See Senate Report Accompanying Senate Bill No. 239 (1836), reprinted in 9 Chisum, supra note 1, at App. 12-2.*

n84 *See Walton & Laddie, Patent Law of Europe & the United Kingdom II/48 (1980); Frost, supra note 82, at 170.*

n85 *Frost, supra note 82, at 170.*

n86 Id.

n87 *Walton & Laddie, supra note 84.*

n88 *Frost, supra note 82, at 171.*

n89 Id.

n90 *Id.; see also Voj cek, supra note 11, at 99-100.*

n91 *Walton & Laddie, supra note 84.*

n92 Id.

n93 Id.

n94 Id.

n95 Id.

n96 *Id.; see also Voj cek, supra note 11, at 101.*

n97 *Walton & Laddie, supra note 84, at VI/14; see also Karl Bruchhausen, The Scope of Patent Protection in Different European Countries An Outline of Recent Case Law, 4 Int'l Rev. Indus. Prop. & Copyright L. 306, 310 (1973) [hereinafter I.I.C].*

n98 *See Whitney v. Emmett, 29 F. Cas. 1074, 1082 (C.C.E.D. Pa. 1831) (No. 17,585).*

n99 *See Frost, supra note 82, at 170; Cornish, Scope and Interpretation of Patent Claims under Article 69 of the EPC 4 (manuscript in possession of the author).*

n100 C.I.P.A. Guide To The Patent Acts cxiii (4th ed., 1995) at 908; see also Bruchhausen, *supra* note 97, at 313-14.

n101 EMI v. Lissen, [1939] 56 R.P.D. & T.M. 23, 39 (H.L.).

n102 *Id.* at 41.

n103 Walton & Laddie, *supra* note 84, at II/50.

n104 Cornish, *supra* note 99.

n105 See generally Bruchhausen, *supra* note 97, at 310- 13.

n106 Butterworths Patent Litigation 198 (Gary M. Ropski, ed. 1995) [hereinafter Butterworths].

n107 *Id.* at 197-98; Walton & Laddie, *supra* note 84, at II/102-07.

n108 Butterworths, *supra* note 106, at 198-199.

n109 Courts also sometimes purported to apply the "pith and marrow" doctrine by implying the word "substantially" in every claim; others sometimes found infringement by mere colorable imitations or devices relying upon kinematic reversal. Walton & Laddie, *supra* note 84, at II/102.

n110 Bruchhausen, *supra* note 97, at 313; P.G. Cole, *Kastner v. Rizla: A Historic Decision on Equivalents?*, 10 E.I.P.R. 617, 623 (1997).

n111 Cornish, *supra* note 99.

n112 Karl Bruchhausen, *The Extent of Protection of the European Patent*, 5 I.I.C. 253, 258 (1974).

n113 Cornish, *supra* note 99.

n114 Voj cek, *supra* note 11, at 144.

n115 *Id.*

n116 *Id.*

n117 *Id.*

n118 Bruchhausen, *supra* note 97, at 322.

n119 *Id.* at 323; C. Sijp, *Scope of Protection Afforded by a European Patent*, 10 I.I.C. 433, 435 (1979).

n120 Voj cek, *supra* note 11, at 144.

n121 Heinz Winkler, *The Scope of Patent Protection: Past, Present and Future*, 10 I.I.C. 296, 296-97 (1979).

N122 *Id.*

n123 *Id.* at 296.

n124 *Id.*

n125 Bruchhausen, *supra* note 97, at 321 (citation omitted).

n126 Id.; *Winkler, supra* note 121, at 297.

n127 Bruchhausen, *supra* note 97, at 321 (citation omitted).

n128 Id. at 321-22.

n129 Id. at 321-23; *Winkler, supra* note 121, at 297; Voj cek, *supra* note 11, at 150.

n130 Bruchhausen, *supra* note 97, at 321-22

n131 Voj cek, *supra* note 11, at 150; Bruchhausen, *supra* note 112, at 264-65.

n132 Bruchhausen, *supra* note 97, at 323 (citation omitted).

n133 Id. at 324.

n134 Id. at 322.

n135 *Winkler, supra* note 121, at 297-98.

n136 Id.; Sijp, *supra* note 119, at 435.

n137 The average person of skill in the art was presumed to apply his or her expert knowledge as of the filing or priority date of the patent. Sijp, *supra* note 119, at 435.

n138 Id.; *Winkler, supra* note 121, at 298.

n139 Sijp, *supra* note 119, at 436.

n140 Id.

n141 Id.

n142 Id.

n143 Id.

n144 Id.

n145 Sijp, *supra* note 119, at 438.

n146 Id. at 437.

n147 *Winkler, supra* note 121, at 298.

n148 Id. at 299.

n149 Sijp, *supra* note 119, at 436.

n150 Id.

n151 Id. at 437.

n152 *Winkler, supra* note 121, at 299.

n153 Id.

n154 Sijp, *supra* note 119, at 437.

n155 Id. at 438.

n156 Id.

n157 German courts subjected non-evident equivalents to patentability requirements because they presumed that the patent office examined only evident equivalents. *Id.*

n158 *Id.*

n159 *Id.*

n160 *Id.* at 438-39.

n161 *Id.* at 439.

n162 *Id.*

n163 Bruchhausen, *supra* note 97, at 324.

n164 *Id.*

n165 *Id.*

n166 *Id.*

n167 *Winkler*, *supra* note 121, at 299.

n168 Sijp, *supra* note 119, at 437.

n169 Edward Armitage, *Drafting and Interpretation of Claims Under New European Patent Laws: A Review of the Benescience Conference in May 1981*, 12 *I.I.C.* 627, 629-34 (1981).

n170 Cornish, *supra* note 99.

n171 Convention on the Grant of European Patents, Oct. 5, 1973, reprinted as amended in *Official Journal of the European Patent Office 1979 in Patent Law and European Patent Convention* (Oguz Akalin, ed., 1991) [hereinafter *EPC*]; Cornish, *supra* note 99, at 1-3.

n172 *Winkler*, *supra* note 121, at 296.

n173 Sijp, *supra* note 119, at 433.

n174 *EPC* art. 2(2) and 64(1) & (3); Paul Tauchner, *The Effect of the Granted Patent in Germany: Scope of Protection and Claim Interpretation*, 1 *CASRIP International Patent Claim Interpretation* 126, 128 (1995).

n175 Except for differences arising by virtue of translation into the different national languages, where required.

n176 Armitage, *supra* note 169, at 627.

n177 *EPC*, art. 69. See also Jan J. Brinkhof, *Some Thoughts on Equivalents*, 22 *I.I.C.* 908, 909-10 (1991).

n178 *The Convention on the Unification of Certain Points of Substantive Law on Patents for Inventions* (the "Strasbourg Convention"). See *Winkler*, *supra* note 121, at 310. See also Bruchhausen, *supra* note 112, at 262.

n179 Bruchhausen, *supra* note 112, at 262.

n180 Protocol on the Interpretation of Article 69 of the European Patent Convention, in *Materials on Intellectual Property* 86 (W.R. Cornish, ed., 1990) [hereinafter Protocol]

n181 Brinkhof, *supra* note 177, at 910.

n182 Sijp, *supra* note 119, at 434.

n183 3 Chisum, *supra* note 1, 8.03, at 8-14 (rel. no. 35, Aug. 1980).

n184 5 Chisum, *supra* note 1, 18.03[1], at 18-26 (rel. no. 28, Nov. 1988) (quoting *Autogiro Co. of America v. United States*, 384 F.2d 391, 398, 155 U.S.P.Q. (BNA) 697, 703 (Ct. Cl. 1967)).

n185 Armitage, *supra* note 169, at 629-30; Bruchhausen, *supra* note 112, at 263; Cornish, *supra* note 80, at 5.

n186 Brinkhof, *supra* note 177, at 911; Armitage, *supra* note 169, at 630-35.

n187 Brinkhof, *supra* note 177, at 911; Armitage, *supra* note 169, at 630-35.

n188 Armitage, *supra* note 169, at 634.

n189 *Winkler*, *supra* note 121, at 310-11.

n190 Bodenheimer & Beton, *supra* note 57, at 86.

n191 EPC, art. 69.

n192 *Id.*; Bodenheimer & Beton, *supra* note 57, at 86.

n193 *Winkler*, *supra* note 121, at 311; Sijp, *supra* note 119, at 433; Bodenheimer & Beton, *supra* note 57, at 85.

n194 Armitage, *supra* note 169, at 631.

n195 *Id.* at 632 (quoting *Beecham Group Ltd. v. Bristol Labs. Ltd.*, [1978] R.P.D. & T.M. 153 (H.L.)).

n196 *Id.*

n197 Brinkhof, *supra* note 177, at 912-13.

n198 *Id.* at 912.

n199 *Id.* at 913.

n200 Armitage, *supra* note 169, at 633.

n201 *Id.*

n202 *Id.*

n203 Draft Treaty on the Harmonization of Patent Laws, art. 21 (1); Bodenheimer & Beton, *supra* note 57, at 89; Brinkhof, *supra* note 177, at 914-15.

n204 Bodenheimer & Beton, *supra* note 57, at 89.

n205 *Id.*

n206 Patent Act of 1977 125. Section 130(7) explicitly states that some of the Act's provisions, including 125, shall "have, as nearly as practicable, the same effects in the

United Kingdom as the corresponding provisions of the European Patent Convention. . .
." Id. See also Douglas Falconer, *The Determination of Subject-matter Protected by a Patent in Grant, Infringement and Revocation Proceedings*, 20 I.I.C. 348, 349 (1989).

n207 [1982] R.P.D. & T.M. 183 (H.L.). The case technically was decided under prior law. Subsequent opinions have confirmed, however, that the Catnic principles meet the dictates of Article 69 and the Protocol, at least according to British courts. See *infra*, note 230 and accompanying text.

n208 Id.

n209 Id. at 243.

n210 Id.

n211 Id.

n212 Id.

n213 Id. at 244.

n214 Id. at 244-45.

n215 *Codex Corp. v. Racal-Milgo Ltd.*, [1983] R.P.D. & T.M. 369, 380 (C.A.).

n216 Id.

n217 Id. at 382-83.

n218 Id. at 382.

n219 Id. at 381-82.

n220 [1990] 17 F.S.R. 181 (Pat. Ct. 1989).

n221 Id. at 189.

n222 Id.; see also *Cole*, *supra* note 110, at 622.

n223 Id.

n224 Id. at 192.

n225 Id. at 192-93.

n226 Id. at 197.

n227 Id.

n228 Id.

n229 Id.

n230 Protocol on the Interpretation of Article 69 of the Convention; see *Brinkhof*, *supra* note 177, at 910. For examples of how this balance has been struck in particular cases, see *Improver Corp. v. Remington Consumer Prods. Ltd.*, [1989] R.P.D. & T.M. 69, 76 (C.A.); *Anchor Bldg. Prods. v. Redland Roof Tiles, Ltd.*, [1990] R.P.D. & T.M. 283, 287 (C.A.); *Southco Inc. v. Dzus Fastener Europe, Ltd.*, [1992] R.P.D. & T.M. 299, 312 (C.A.); *Kastner v. Rizla Ltd.*, [1995] R.P.D. & T.M. 585, 594 (C.A.), abridged in 28 I.I.C. 114 (1997).

n231 Improver, [1989] R.P.D. & T.M. at 76.

n232 Bodenheimer & Beton, supra note 57, at 87.

n233 Id.

n234 Id.; Falconer, supra note 206, at 351-52.

n235 Bruchhausen, supra note 97, at 313.

n236 Bodenheimer & Beton, supra note 57, at 87; Falconer, supra note 206, at 351-52.

n237 Catnic Components Ltd. V. Hill & Smith, Ltd., [1982] R.P.D. & T.M. 183, 243 (H.L.).

n238 [1995] R.P.D. & T.M. 585 (C.A.), abridged in 28 I.I.C. 114 (1997). See also Cole, supra note 110.

n239 Id.

n240 Id. at 622.

n241 Id. at 623.

n242 Id.

n243 Id.

n244 Kastner v. Rizla, Ltd., 28 I.I.C. 114, 117 (1997).

n245 Cole, supra note 110, at 619.

n246 Id.

n247 Id. at 627.

n248 Kastner, 28 I.I.C. at 117.

n249 Id.

n250 Cole, supra note 110, at 623.

n251 See Bruchhausen, supra note 112, at 264.

n252 Id.

n253 Id.; Sijp, supra note 119, at 447 (referring to the "general inventive concept").

n254 Bruchhausen, supra note 112, at 264.

n255 Id.

n256 Albrecht Krieger, The New German Patent Law After Its Harmonization With European Patent Law A General Survey, 13 I.I.C. 1, 1-2 (1982).

n257 Id. at 2. In fact, section 14 previously had been adopted separately in 1978. Id.

n258 Abridged and translated in 18 I.I.C. 795 (1987) (BGH).

n259 Id. at 798.

n260 Id.

n261 Id.

n262 Id. at 798.

n263 Id.

n264 Id.

n265 Id. at 799.

n266 Id.; see also Bodenheimer & Beton, *supra* note 57, at 86-87.

n267 Formstein, 18 I.I.C. at 799.

n268 Id. See also Beheizbarer Atemluftschlauch (Heatable Breathing Air Hose), abridged and translated in 24 I.I.C. 259 (1993) (BGH 1991); Befestigungsvorrichtung II (Fixing Device II), abridged and translated in 23 I.I.C. 111 (1992) (BGH 1990); Autowaschvorrichtung (Apparatus for Washing Vehicles), abridged and translated in 23 I.I.C. 120 (1992) (BGH 1990); Ionenanalyse (Ion Analysis), abridged and translated in 22 I.I.C. 249 (1991) (BGH 1988); Batteriekastenschnur (Handle Cord for Battery Case), abridged and translated in 22 I.I.C. 104 (BGH) (1991) (BGH 1989).

n269 Formstein, 18 I.I.C. at 800.

n270 Id.

n271 Id.

n272 German courts have left open the issue of whether Article 69 and the Protocol permit subcombination protection. See Beheizbarer Atemluftschlauch (Heatable Breathing Air Hose), 24 I.I.C. at 261.

n273 *Improver Corp. v. Remington Consumer Prods. Ltd.*, [1990] 17 F.S.R. 181, 189 (Pat. Ct. 1989).

n274 Id.

n275 Id. at 197

n276 *Epilady Germany II*, abridged and translated in 24 I.I.C. 838, 839 (1993) (OLG 1991).

n277 Id. at 841-42.

n278 Id. at 842.

n279 Id.

n280 Id. at 843.

n281 Id. at 843-45.

n282 See Frost, *supra* note 82.

n283 Sijp, *supra* note 119, at 435.

n284 See Bruchhausen, *supra* note 97, at 323.

n285 See, e.g., John McDermott, Hilton Davis and The Doctrine of Equivalents: A Little Change, A Little Mischief, 37 IDEA 755, 757 (1997).

- n286 Brinkhof, *supra* note 177, at 911.
- n287 EPC, art. 69.
- n288 Frost, *supra* note 82.
- n289 Patent Act of 1977 130(7).
- n290 Bruchhausen, *supra* note 97, at 310-13.
- n291 *Id.* at 313.
- n292 *Id.*
- n293 Butterworths, *supra* note 106, at 197, 98; Walton & Laddie, *supra* note 84, at II 1102-07.
- n294 *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1982] R.P.D. & T.M. 183, 243 (H.L).
- n295 *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29, 41 U.S.P.Q.2d (BNA) 1865, 1873 (1997).
- n296 *Catnic*, [1982] R.P.D. & T.M. at 243.
- n297 *Warner-Jenkinson*, 520 U.S. at 37, 41 U.S.P.Q.2d at 1874.
- n298 *Catnic*, [1982] R.P.D. & T.M. at 243.
- n299 *Sijp*, *supra* note 119, at 438.
- n300 *Id.*
- n301 *Id.* at 438-39.
- n302 *Formstein (Moulded Curbstone)*, abridged and translated in 18 I.I.C. 795, 799 (1987) (BGH).
- n303 *Id.*
- n304 *Epilady Germany II*, abridged and translated in 24 I.I.C. 838, 842 (1993) (OLG 1991).
- n305 *Bodenheimer & Beton*, *supra* note 57 at 84 n.12.
- n306 *Formstein*, 18 I.I.C. at 799.
- n307 *Epilady Germany II*, 24 I.I.C. at 242.