

# THE IMPERFECTION OF LANGUAGE: *FESTO* SETS A FORESEEABILITY BAR FOR PROSECUTION HISTORY ESTOPPEL

BY DAVID B. WALKER\*

## I. Introduction

In its recent decision in *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd* (“*Festo II*”), the United States Supreme Court established a new balance between two significant and competing doctrines in patent law, the doctrine of equivalents and prosecution history estoppel.<sup>1</sup> The long-standing balance between these two doctrines was unsettled by the decision below, in which the United States Court of Appeals for the Federal Circuit (“Federal Circuit”) rejected the “flexible bar” of its prior precedent<sup>2</sup> as unworkable and adopted a “complete bar.”<sup>3</sup> In *Festo II*, the Supreme Court announces a guiding principle—the imperfection of language—to govern the balancing of the competing doctrines while satisfying the incentive and notice functions of the patent system. Applying that principle, the Court rejects the complete bar established by the court below and instead adopts a foreseeability bar to govern the application of prosecution history estoppel. The foreseeability bar does not bar all equivalents to elements narrowed by patentability-based amendments as did the complete bar, but does apply a sufficiently heightened standard compared to the flexible bar to be more “complete” than “flexible.” Although the new standard follows a substantially different path to determine the application and scope of estoppel than the complete bar, the foreseeability bar applies prosecution history estoppel so stringently that a limited number of cases likely will meet its strict standards for the availability of equivalents to amended claim elements.<sup>4</sup>

## II. The Conflict Between Incentives and Notice—Balancing the Doctrine of Equivalents and Prosecution History Estoppel

The monopoly granted when a patent issues represents a bargain between the inventor and the public. The patent laws “promote the Progress of Science and useful Arts” by rewarding innovation with a temporary monopoly.<sup>5</sup> In return for this property right, the inventor agrees to dedicate the invention to the public after the term of the patent expires.<sup>6</sup> To facilitate that dedication, the patentee must describe his or her invention in “full, clear, concise, and exact terms.”<sup>7</sup> The Supreme Court describes this “as part of the delicate balance the law attempts to maintain between inventors, who rely on the promise of the law to bring the invention forth, and the public, which should be encouraged to pursue innovations, creations, and new ideas beyond the inventor’s exclusive rights.”<sup>8</sup> Thus, the patent system serves two competing functions: (1) to provide incentives to the inventor to bring forth the invention in the first place; and (2) to provide notice to the public of the metes and bounds of the patent grant.

The patent system can only perform its incentive function if inventors believe they will receive adequate protection for their inventions.<sup>9</sup> The doctrine of equivalents enhances incentives to inventors by protecting a patent holder “against efforts of copyists to evade liability for

infringement by making only insubstantial changes to a patented invention.”<sup>10</sup> Indeed, the Supreme Court has long recognized the role of the doctrine of equivalents in securing the patentee’s right to the full measure of the invention. In 1854, the Court stated that “[t]he exclusive right to the thing patented is not secured, if the public are at liberty to make substantial copies of it, varying its form or proportions.”<sup>11</sup> In *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, the Court similarly observed that:

to permit imitation of a patented invention which does not copy every literal detail would be to convert the protection of the patent grant into a hollow and useless thing. . . . It would deprive [the patentee] 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.<sup>12</sup>

Most recently, the Court reaffirmed the doctrine of equivalents in *Warner-Jenkinson*.<sup>13</sup>

Although the availability of equivalents enhances incentives, it also creates uncertainty and potentially undermines the notice function of the patent claims.<sup>14</sup> This uncertainty can lead to at least three undesirable side effects: (1) deterrence of competitors from legitimate manufactures; (2) mistaken investment in development of protected subject matter; and (3) wasteful litigation.<sup>15</sup> Despite these unintended consequences, the Court concludes, as it had in each previous consideration of the two doctrines,<sup>16</sup> that the uncertainty introduced by the doctrine of equivalents is the price of ensuring appropriate incentives for innovation.<sup>17</sup> Thus, the Court embraces the necessity of a more complex and less bright-line rule as an inherent cost of maintaining the incentives to innovation that are central to the patent system. After concluding that the doctrine of equivalents is necessary to the incentive function, the Court sets about establishing a framework for the application of prosecution history estoppel to balance the incentive and notice functions of the patent system.

## III. A “New” Governing Principle—the Imperfection of Language Precludes a Complete Bar

*Festo II* reaffirms the Court’s earlier precedent that “equivalents remain a firmly entrenched part of the settled rights protected by the patent,” but bases that conclusion on a premise not clearly articulated in those prior opinions—language’s inability to capture the essence of innovation.<sup>18</sup> Defining new inventions using existing terminology is a difficult process and, “the nature of language makes it impossible to capture the essence of a thing in a patent application.”<sup>19</sup>

“An invention exists most importantly as a tangible structure or a series of drawings. A verbal portrayal is usually an afterthought written to satisfy the requirements of patent law. This conversion of machine to words allows for unintended idea gaps which

cannot be satisfactorily filled. Often the invention is novel and words do not exist to describe it. The dictionary does not always keep abreast of the inventor. It cannot. Things are not made for the sake of words, but words for things.” *Autogiro Co. of America v. United States*, 181 Ct. Cl. 55, 384 F.2d 391, 397 (1967). The language in the patent claims may not capture every nuance of the invention or describe with complete precision the range of its novelty.<sup>20</sup>

This imperfection of language principle pervades the opinion and is largely used to justify the standard set by the Court for the application of the doctrine of equivalents and prosecution history estoppel.

Since language is imperfect, patents cannot be limited to their literal terms; to do so would “greatly diminish” their value.<sup>21</sup> Accordingly, the Court rejected what it described as “the clearest rule of patent interpretation, literalism” as less than the most efficient, despite the potential for conservation of judicial resources.<sup>22</sup> Language remains imperfect after amendment, as before, and the patentee may have no greater insight into the proper language to define his invention at the time of amendment than when the original application was filed.<sup>23</sup> Thus, Literalism is no more appropriate for the amended than the unamended claim.<sup>24</sup>

The application and scope of estoppel in *Festo II* also are heavily influenced by the imperfection of language principle. “Prosecution history estoppel ensures that the doctrine of equivalents remains tied to its underlying purpose” to compensate for “language’s inability to capture the essence of innovation.”<sup>25</sup> Estoppel applies to the case “[w]here the original application once embraced the purported equivalent but the patentee narrowed his claims to obtain the patent or to protect its validity, [because] the patentee cannot assert that he lacked the words to describe the subject matter in question.”<sup>26</sup> “In that instance the prosecution history has established that the inventor turned his attention to the subject matter in question, knew the words for both the broader and narrower claim, and affirmatively chose the latter.”<sup>27</sup>

Finally, the Court’s newly announced foreseeability bar is firmly rooted in the imperfection of language. *Festo II* appropriately notes that “[t]he patentee, as the author of the claim language, may be expected to draft claims encompassing readily known equivalents.”<sup>28</sup> This is consistent with the imperfection of language principle, because the doctrine of equivalents is intended to protect only those equivalents whose essence cannot be captured by language; readily known equivalents—by definition—would not qualify.<sup>29</sup> The quintessential case for the application of prosecution history estoppel is when the patentee originally claimed the alleged equivalent subject matter but then narrowed the claim in response to a rejection to literally exclude the equivalent. In that case, he may not argue that the surrendered territory was *unforeseen* subject matter that should be held equivalent.<sup>30</sup> This, too, is consistent with the imperfection of language principle because the existence of a prior claim precisely describing the alleged equivalent elements undercuts the argument that the inventor lacked the words—that the *equivalent was unforeseeable* when the ap-

plication was amended—and thus the basic premise to the doctrine of equivalents does not apply.<sup>31</sup> The Court therefore is internally consistent in following the imperfection of language principle while adopting the foreseeability bar.

#### IV. The Foreseeability Bar—Finding a Balance Between Incentives and Notice

The thorny question before the *Festo II* Court was how to set a framework for determining the subject matter relinquished by narrowing amendment without entirely eviscerating the doctrine of equivalents. If the doctrine of equivalents is read too broadly, it threatens the notice function of the patent claims; if prosecution history estoppel is applied too strictly, it threatens the incentive function of the patent system. Thus, a balance is necessary between incentives and notice because, as one of the two doctrines is favored, one function benefits while the other is impaired.

The foreseeability bar was argued by one of the amici, the Institute of Electrical and Electronics Engineers – United States of America (“IEEE”), as an appropriate balance between the incentive function and the notice function of patents.<sup>32</sup> The IEEE argued that the doctrine of equivalents should apply, notwithstanding a patentability-based, narrowing amendment, “unless the limiting effect of the amended language with respect to an accused device would have been foreseeable at the time of the amendment.”<sup>33</sup> This foreseeability bar would be applied objectively, from the perspective of a reasonable person skilled in the art.<sup>34</sup> This is not precisely the standard adopted by the *Festo II* Court—the Court focused on the foreseeability of the *equivalent*, not of the *limiting effect*—but the arguments concerning the relative merits of the foreseeability bar, the complete bar, and the flexible bar nevertheless are instructive.

The proposed standard was purported at once to be more equitable than the complete bar and more certain than the flexible bar. The Federal Circuit’s complete bar shifted the balance between incentives and notice too far in favor of certainty and notice, and did so at the expense of protection for the essence of the invention and, therefore, incentives for future disclosure of inventions.<sup>35</sup> Indeed, the Court specifically rejected the complete bar as “inconsistent with the purpose of applying estoppel in the first place—to hold the inventor to the representations made during the application process and the inferences that reasonably may be drawn from the amendment.”<sup>36</sup> Divorced from its legal roots, the complete bar can work an injustice by creating a roadmap for infringement, whereby potential copyists can abscond with the substance of the invention while making only insubstantial changes to the patented subject matter.<sup>37</sup> The negative implications of the complete bar have also been exacerbated by the broad reading of *Festo I* by the Federal Circuit and the lower courts prior to its nullification by *Festo II*.<sup>38</sup> Conversely, a return to the flexible bar would reintroduce the uncertainty and failure to provide adequate public notice that drove the Federal Circuit to adopt the complete bar in the first place.<sup>39</sup> Without predictability, the flexible bar utterly fails to provide public notice of the metes and bounds of the patent grant. It is also debatable whether the flexible bar actually favors incentives to disclose inventions; if the inven-

tor cannot know with some degree of certainty what will be protected by the claims of his patent, he may be reluctant to disclose his invention.<sup>40</sup> Rather than adopting the complete bar or reverting to the flexible bar—each with their recognized deficiencies—the Supreme Court forged a new standard to provide a more balanced approach to the competing doctrines.

Although not a complete bar, the standard set forth in *Festo II* is a far cry from the flexible bar of *Hughes* and its progeny and will permit resort to equivalents only in a limited number of cases. Certain portions of the *Festo II* standard remain unchanged from *Warner-Jenkinson*.<sup>41</sup> The Court also extends the holding of *Warner-Jenkinson* to make clear that estoppel may apply to any narrowing, patentability-based amendment, not just amendments to overcome the prior art.<sup>42</sup> It further expounds that when “the patentee originally claimed the subject matter alleged to infringe but then narrowed the claim in response to a rejection, he may not argue that the surrendered territory comprised unforeseen subject matter that should be deemed equivalent to the literal claims of the issued patent.”<sup>43</sup> A patentee’s decision to narrow his claims through amendment—and not to appeal the rejection—may be presumed to be a general disclaimer of the territory between the original claim and the amended claim.<sup>44</sup> This establishes a heavy presumption that estoppel applies to narrowing amendments made for reasons related to patentability. Moreover, the Court extended the logic of *Warner-Jenkinson* to require the patentee to show that the amendment does not surrender the particular equivalent in question.<sup>45</sup> To meet this burden, “[t]he patentee must show that at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent.”<sup>46</sup> The foreseeability bar thus retreats from the literalism of the complete bar, while creating a presumption that estoppel applies and placing additional burdens of proof on the patentee to overcome that presumption that were not present under the flexible bar.

## V. More Complexity and Potentially Similar Results

In practice, the foreseeability bar introduces a significant measure of complexity at trial and during prosecution. Under the new standard, the scope of prosecution history estoppel is based on what was foreseeable to one skilled in the art at the time the subject amendment was filed. The new emphasis on foreseeable equivalents likely will lead to additional expert testimony regarding what claims one skilled in the art could reasonably be expected to draft at the time of amendment. Bearing the burden of proof, the patentee must prove a negative—that the desired equivalent could not have been foreseen by one of skill in the art.<sup>47</sup> This will add another layer of complexity to trial and may make it considerably harder in practice to obtain coverage under the doctrine of equivalents than was the case under the flexible bar. It will be difficult to find documentary evidence that a particular equivalent was unforeseeable, forcing the patentee to rely predominantly on expert testimony to support his assertions of unforeseeability.<sup>48</sup> The accused infringer will need to bring forth evidence, expert or documentary, to refute the patentee’s testimony that the particular equivalent was unforeseeable. This may prove an easier task for the in-

fringer because he potentially can introduce documents showing that the equivalents were known at the time of amendment or at least to support an argument that the equivalent then was foreseeable. In patent prosecution, the complete bar provided a powerful incentive not to amend claims and instead to appeal rejections of pending claims to the Board of Patent Appeals and Interferences. The foreseeability bar avoids the literalism of the complete bar by allowing some flexibility in amending patent claims and providing a standard that is more understandable and predictable than the flexible bar; the pressure to appeal rather than amend should be somewhat less under the new standard. Inventors and their patent attorneys now must take care to claim all foreseeable equivalents and must evaluate foreseeability each time a new amendment is filed, but are not foreclosed from asserting any equivalents to amended claims. The Supreme Court accepted these inherent complications of the foreseeability bar as preferable to the harm to incentives inflicted by the complete bar.

*Festo II* does not provide an exhaustive list of the circumstances under which equivalents will be available to a limitation narrowed by an amendment substantially related to patentability, but does make clear that such circumstances will be the exception rather than the norm. The types of equivalents that may be allowed under the new standard, include: (1) equivalents unforeseeable at the time of the amendment and beyond a fair interpretation of what was surrendered; and (2) equivalents for aspects of the invention that have only a peripheral relation to the reason the amendment was submitted.<sup>49</sup> A literal reading of the first category requires that, to avoid estoppel, the equivalent sought by the patentee both (1) have been unforeseeable when the amendment was filed; and (2) be outside a reasonable interpretation of what was surrendered. This implies a two-part analysis whereby the court will consider, first, what the amendment reasonably surrendered and, second, what equivalents were foreseeable at the time. If the equivalent sought by the patentee falls within the either category, the patentee will be estopped from asserting the desired equivalent.<sup>50</sup> This two-part analysis significantly increases the likelihood of estoppel as compared to the flexible bar, which lacked the second step of the analysis. Thus, the foreseeability bar applies estoppel more broadly than the flexible bar and therefore will permit resort to the doctrine of equivalents in fewer cases. In fact, the combination of (1) the strong presumption that estoppel applies to narrowing, patentability-based amendments; (2) the burden on the patentee to prove the negative assertion that the proffered equivalent was not foreseeable at the time of amendment; and (3) the additional layers of analysis imposed on top of the flexible bar result in a more complete than flexible bar.

## VI. Conclusions

The Supreme Court clearly adopted a new standard for the application of prosecution history estoppel—one based on the imperfection of language and the need for protection of equivalents to secure the proper incentives to promote science and the useful arts. The standard applies a foreseeability bar, which permits the doctrine of equivalents to protect only those



equivalents that were not foreseeable by one of skill in the art when the narrowing, patentability-based amendment was filed. In principle, the foreseeability bar is imminently reasonable and restores a balance between incentives and notice. The patentee and his attorneys should not be asked to do the impossible—to explicitly claim the unforeseeable. The new standard avoids the draconian loss of all equivalents imposed by the complete bar and permits greater flexibility in amending claims during prosecution. The foreseeability bar provides some guidance to patent practitioners to guide the amendment process and, therefore, should prove somewhat more predictable than the flexible bar.

In practice, however, the new standard adds another layer of complexity to both trial and prosecution. Although not a complete bar, the flexible bar places considerable burdens on the patentee, including the requirement to prove the negative proposition that the asserted equivalent was not foreseeable at the time of amendment. The heightened standard relative to the flexible bar of old likely will lead to more complete than flexible application of prosecution history estoppel and availability of equivalents in fewer cases than did the flexible bar. In the end, the greater complexity and uncertainty of the foreseeability bar compared to the complete bar is a necessary evil to provide adequate protection and incentives to disclose inventions. Although the foreseeability bar represents a compromise between the complete and flexible bars, the utility of the new standard in maintaining the proper balance between incentives and notice will become clear only after case-by-case development.

\*The author is an associate in the Intellectual Property Group of Wiley Rein & Fielding LLP and a member of the Intellectual Property Practice Group of the Federalist Society. Any views expressed are solely his own. The author would like to thank Floyd Chapman for his insightful comments on earlier drafts of this article.

## Footnotes

<sup>1</sup> 122 S. Ct. 1831 (2002). The doctrine of equivalents protects a patent holder “against efforts of copyists to evade liability for infringement by making only insubstantial changes to a patented invention,” *id.* at 1835, while prosecution history estoppel allows competitors to rely on the public record of the patent proceedings, to limit the doctrine of equivalents. *Id.*  
<sup>2</sup> The flexible bar was adopted in the Federal Circuit’s 1983 decision in *Hughes Aircraft Co. v. United States*, which stated that prosecution history estoppel “may have a limiting effect” on the doctrine of equivalents “within a spectrum ranging from great to small to zero.” 717 F.2d 1351, 1363 (Fed. Cir. 1983).  
<sup>3</sup> *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 574 (Fed. Cir. 2000) (*en banc*) (“*Festo I*”) (“We hold that prosecution history estoppel acts as a complete bar to the application of the doctrine of equivalents when an amendment has narrowed the scope of a claim for a reason related to patentability.”), *vacated by* 122 S. Ct. 1831 (2002).  
<sup>4</sup> The Supreme Court has granted certiorari for cases decided under the *Festo I* complete bar, *vacated*, and remanded for reconsideration in light of the new foreseeability bar. See, e.g., *Pioneer Magnetics, Inc. v. Micro Linear Corp.*, 122 S. Ct. 2322, 2322 (2002) (granting certiorari, vacating, and remanding for further consideration in light of *Festo II*). This will provide an empirical opportunity to consider how often the application of the foreseeability bar changes the outcome of individual cases decided under the complete bar.  
<sup>5</sup> U.S. Const., Art. I, § 8, cl. 8.  
<sup>6</sup> *Festo II*, 122 S. Ct. at 1840 (“[E]xclusive patent rights are given in exchange for disclosing the invention to the public.”) (citing *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150-51 (1989)).  
<sup>7</sup> 35 U.S.C. § 112.  
<sup>8</sup> *Festo II*, 122 S. Ct. at 1837 (citing *Bonito Boats*, 489 U.S. at 150 (1989)).  
<sup>9</sup> See *infra* note 12 and accompanying text.  
<sup>10</sup> *Id.* at 1835.  
<sup>11</sup> *Winans v. Denmead*, 56 U.S. (15 How.) 330, 343 (1854).  
<sup>12</sup> 339 U.S. 605, 607 (1950).  
<sup>13</sup> 520 U.S. at 28.

<sup>14</sup> *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29 (1997) (“There can be no denying that the doctrine of equivalents, when applied broadly, conflicts with the definitional and public-notice functions of the statutory claiming requirement.”).  
<sup>15</sup> *Id.* at 1837.  
<sup>16</sup> *Id.* at 1838 (noting that *Winans* and *Graver Tank* adopted the doctrine of equivalents over vociferous dissents while *Warner-Jenkinson* unanimously accepted the doctrine of equivalents based, at least in part, on its lengthy history).  
<sup>17</sup> *Id.*  
<sup>18</sup> *Id.* at 1839 (“The doctrine of equivalents is premised on language’s inability to capture the essence of innovation. . . .”).  
<sup>19</sup> *Id.* at 1837.  
<sup>20</sup> *Id.*  
<sup>21</sup> *Id.*  
<sup>22</sup> *Id.*  
<sup>23</sup> *Id.* at 1841 (“After amendment, as before, language remains an imperfect fit for invention. The narrowing amendment may demonstrate what the claim is not; but it may still fail to capture precisely what the claim is. . . . The amendment does not show that the inventor suddenly had more foresight in the drafting of claims than an inventor whose application was granted without amendments having been submitted”).  
<sup>24</sup> *Id.* (“[T]here is no more reason for holding the patentee to the literal terms of an amended claim than there is for abolishing the doctrine of equivalents altogether and holding every patentee to the literal terms of the patent.”).  
<sup>25</sup> *Id.* at 1839.  
<sup>26</sup> *Id.*  
<sup>27</sup> *Id.*  
<sup>28</sup> *Id.* at 1842.  
<sup>29</sup> See *supra* note 18.  
<sup>30</sup> See *supra* note 26 and accompanying text.  
<sup>31</sup> *Id.* at 1839.  
<sup>32</sup> Brief of Amicus Curiae Institute of Electrical and Electronics Engineers – United States of America, at 18, *Festo II*, 122 S. Ct. 1831 (2002) (No. 00-1543) (“IEEE Brief”); see also Matthew J. Conigliaro et al., *Foreseeability in Patent Law*, 16 BERKELEY TECH L.J. 1045 (2001) (adapted from IEEE brief).  
<sup>33</sup> IEEE Brief, at 18.  
<sup>34</sup> *Id.*  
<sup>35</sup> For a general discussion of the flaws of the complete bar, see Conigliaro, *supra* note 32, at 1061-64.  
<sup>36</sup> *Festo II*, 122 S. Ct. at 1840.  
<sup>37</sup> *Festo I*, 234 F.3d at 627 (“[T]he [Federal Circuit’s] new rule hands the unscrupulous copyist a free ride on potentially valuable patented technology, as long as the copyist merely follows the prosecution history road map and makes a change, no matter how trivial or insubstantial, to an element otherwise covered by such a narrowed claim limitation.”) (dissenting opinion of Linn, J.)  
<sup>38</sup> Conigliaro, *supra* note 32, at 1063 n.57 (citing cases).  
<sup>39</sup> *Festo I*, 234 F.3d at 575 (“A problem with the flexible bar approach is that it is virtually impossible to predict before the decision on appeal where the line of surrender is drawn.”).  
<sup>40</sup> See *Festo II*, 122 S. Ct. at 1837 (“The inventor who chooses to patent an invention and disclose it to the public, rather than exploit it in secret, bears the risk that others will devote their efforts toward exploiting the limits of the patent’s language.”)  
<sup>41</sup> The patentee continues to bear the burden of proving that a narrowing amendment was not made for reasons related to patentability, and a complete bar continues to apply to unexplained narrowing amendments. *Festo II*, 122 S. Ct. at 1841-42 (“In *Warner-Jenkinson* we struck the appropriate balance by placing the burden on the patentee to show that an amendment was not for purposes of patentability. Where no explanation is established, however, the court should presume that the patent application had a substantial reason related to patentability for including the limiting element added by amendment. In those circumstances, prosecution history estoppel would bar the application of the doctrine of equivalents as to that element.”).  
<sup>42</sup> *Id.* at 1839-40 (“We agree with the Court of Appeals that a narrowing amendment made to satisfy any requirement of the Patent Act may give rise to an estoppel.”). The Court also left open the possibility that amendments unrelated to patentability could also lead to estoppel. *Festo II*, 122 S. Ct. at 1839 (citing *Warner-Jenkinson* for the proposition “that even if the amendment’s purpose were unrelated to patentability, the court might consider whether it was the kind of reason that nonetheless might require estoppel.”).  
<sup>43</sup> *Id.* at 1838.  
<sup>44</sup> *Id.* at 1842 (citing *Exhibit Supply*, 315 U.S., at 136-37 (“By the amendment [the patentee] recognized and emphasized the difference between the two phrases and proclaimed his abandonment of all that is embraced in that difference”).  
<sup>45</sup> *Id.* (“Just as *Warner-Jenkinson* held that the patentee bears the burden of proving that an amendment was not made for a reason that would give rise to estoppel, we hold here that the patentee should bear the burden of showing that the amendment does not surrender the particular equivalent in question.”).  
<sup>46</sup> *Id.* at 1842.  
<sup>47</sup> See *supra* note 46 and accompanying text.  
<sup>48</sup> Although the absence of documentary evidence disclosing contemporaneous knowledge of the relevant equivalent or its interchangeability with the literal limitation may support a conclusion of unforeseeability, the patentee may only be able to prove that absence by expert testimony.  
<sup>49</sup> *Id.* at 1840.  
<sup>50</sup> This two-part analysis will not be necessary for equivalents for aspects of the invention that have only a peripheral relation to the reason the amendment was submitted, which are cited as an independent category of equivalents not foreclosed under the foreseeability bar. *Id.*