OPENING THE ‘PANDORA’S BOX’ OF PATENT CLAIM CONSTRUCTION: PURPOSIVE INTERPRETATION, CENTRAL CLAIMING AND THE DOCTRINE OF EQUIVALENTS IN COMPARATIVE PERSPECTIVE

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SYNOPSIS

This article argues that patent claim construction in modern times is stymied by a misguided perception that the “doctrine of equivalents” is dead or in decline. Through a comparative survey of the patent jurisprudence in three selected jurisdictions – the United States, the United Kingdom and Canada – this article posits that “equivalents-analysis”, far from being defunct, is embedded in the processes of patent interpretation, and continues to play an integral role in protecting inventions against infringements of a “non-literal” nature. It seeks to refocus the debate on determining patent scope from whether a doctrine of equivalents is needed, to how it can be more effectively applied in contextual, industry-specific situations. The article concludes with some thoughts on the factors that would favour a more robust application of the doctrine of equivalents, as part of an ongoing effort to construct a more effective and flexible framework to balance the protection of innovation with the preservation of fair competition in a vibrant knowledge-based economy.

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I. INTRODUCTION

Among the various branches of intellectual property rights (IPRs), patent law appears to provide the most extensive scope of protection against infringement. It is sometimes referred to in the literature as the only IPR that grants a “true monopoly” over protected subject matter.¹

¹ See for instance Charlotte Waelde et al, Contemporary Intellectual Property: Law and Policy, 3rd ed (Oxford: Oxford University Press, 2014) at 14, where it is suggested that patents confer an “absolute monopoly”, while copyright only grants a monopoly over the “expression of one’s own creation”. It is important to note, nevertheless, that while patent protection appears to approach that of an “absolute monopoly”, certain uses of a patented invention are statutorily exempted from liability. See for instance section
The exclusive rights that are conferred by a successful patent grant can indeed yield significant economic benefits and market advantages, especially if the patented invention discloses a highly sought after and lucrative new technology. Yet, the method of determining the precise scope of a patent claim has always been a rather thorny issue for both courts and patent examiners. Striking the ever-elusive balance between certainty and the protection of proprietary rights remains an important challenge in the field of patent claim construction. Some commentators have suggested that the precise boundaries of a patent are shrouded in uncertainty, by comparing the boundary-defining process to a rarely-opened factfinder’s “black box.” It is this sense of uncertainty, arising primarily from the inadequacies of human language in describing the nuances of technical achievement, coupled with the unpredictability of interpretation, which can result in the

60(5) of the Patents Act 1977 (as amended) (UK), which provides a list of exceptions to infringement, such as private, non-commercial acts and acts for experimental purposes.

In this regard, Merges and Nelson observe that the economic significance of a patent depends heavily on its scope. “The broader the scope, the larger the number of competing products and processes that will infringe the patent.” See Robert P Merges & Richard R Nelson, “On the Complex Economics of Patent Scope” (1990) 90 Colum L Rev 839 at 839.

See David I Bainbridge, Intellectual Property, 9th ed (Essex, England: Pearson Education Ltd, 2012) at 536, who notes that “the balance between fair protection and a reasonable degree of certainty is difficult to achieve consistently and is often a matter of deciding where to draw the line.”

See Dan L Burk & Mark A Lemley, “Fence Posts or Sign Posts? Rethinking Patent Claim Construction” (2009) 157 U Pa L Rev 1743 at 1770-72. This comparison to a “black box” was made in the context of patent interpretation in the period before the decision in Markman v Westview Instruments, Inc, 517 US 370 (1996), during which time the exact boundary of an invention was treated as a fact-specific question to be determined by the judge or jury. In Markman, however, it was held by the federal circuit and affirmed by the US Supreme Court that construction of patent documents, as a matter of law, was to be done transparently in a pre-trial (“Markman”) proceeding by judges, not juries. See also Burk & Lemley, ibid at 1750.

See S Jay Plager, “Challenges for Intellectual Property Law in the Twenty-First Century: Indeterminacy and Other Problems” (2001) U Ill L Rev 69 at 69, who identifies “indeterminacy” as a significant concern in patent law, noting, in addition, that predictability and clarity are essential ingredients of a legal system. Plager also employs, at 80, the “black box” metaphor, suggesting that, historically speaking, jury determinations of patent scope in the United States were “black-box decisions, impenetrable by the ordinary rules of law.”
loss of a patent’s effectiveness in protecting an invention against competing variants and after-arising technologies.\(^6\)

In addition to bearing some resemblance to a factfinder’s “black box”, the rather challenging task of “decoding” the precise boundaries of a patent can sometimes be likened to opening a “Pandora’s Box”.\(^7\) Although small differences in terminology used in a patent claim might seem insignificant, their interpretation can produce unforeseeable and perhaps even dramatic changes to the scope of protection. Like the proverbial Pandora’s Box, the methodology of patent claim interpretation has the potential to unleash uncertainty and possibly catastrophic losses if applied in a misguided or overly restrictive way.\(^8\)

The doctrine of equivalents has traditionally played a key role in protecting the fruits of innovation from being misappropriated by third parties seeking to escape liability for infringement by making minor variations to patented technology.\(^9\) Simply put, the doctrine “expands” the patent scope to include “functional equivalents” – designed to perform the same functions as the patented invention, with no material differences –

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\(^6\) After-arising technologies (such as “hook and loop” fasteners which serve the same function as a conventional fastener but which work using a different mechanism) pose a significant challenge to patentees since the claim language of the patent is “frozen” at the date of filing. See Christopher A. Cotropia, “After-Arising Technologies and Tailoring Patent Scope” (2005) 61 NYU Ann Surv Am L 151 at 151 and 153.

\(^7\) According to Greek mythology and Hesiod’s Works and Days, Pandora (meaning “all-gifts” in Greek) was a woman fashioned out of earth, upon whom the gods bestowed their choicest gifts. She later came into possession of “a jar containing all manner of misery and evil.” She opened the jar, releasing the evils all over the earth, leaving only hope remaining within. See “Pandora, Greek Mythology”, Encyclopædia Britannica, online, at: <global.britannica.com/EBchecked/topic/441113/Pandora>.

\(^8\) The losses that can flow from an “unsympathetic” reading of a patent claim can be very substantial. Doug Lichtman notes, in the context of Tessera Technologies’ patent claim relating to “flexible” semi-conductor housing, that the results of even a slight ambiguity in claim language can be disastrous for a patentee, the key issue being whether “flexibility” is a necessary quality of the various electronic components in their unassembled state, their assembled state, or both. Even a small “blunder” in claim drafting could cost a patent owner millions of dollars, particularly in the hands of an unsympathetic court. Yet it is perhaps uncharitable to fault patent drafters for every unsympathetic interpretation that might arise, since it is a significant challenge to draft a “perfect” patent claim without allowing it to become too unwieldy or cumbersome. See Doug Lichtman, “Substitutes for the Doctrine of Equivalents: A Response to Meurer and Nard” (2005) 93 Geo LJ 2013 at 2017.

\(^9\) Burk & Lemley, supra note 4 at 1763.
even if those equivalents fall outside the literal scope of the patent claim.\textsuperscript{10} However, there appears to be a trend in major industrialised countries, most notably the United States and the United Kingdom, to move away from “equivalents-analysis” in favour of an approach which determines the scope of protection by reference to the express terms of the patent claim. The move toward “peripheral claiming” in the United States, coupled with the adoption of “purposive construction” in the United Kingdom, has been likened by some commentators to the “sounding of the death knell” for the doctrine of equivalents.\textsuperscript{11} Canadian courts appear to have followed in the footsteps of the United Kingdom by citing and endorsing the “purposive interpretation” approach to claim construction.

Interestingly, there has been relatively little published work to date on the status of the doctrine of equivalents in Canadian patent law. This article seeks to fill the lacuna in the literature by critically evaluating whether contemporary trends in patent construction have effectively demolished the doctrine of equivalents. Through a comparative analysis, the article will endeavour to situate Canada’s approach among these contemporary trends, and to explore how Canadian patent law has responded to these trends. In doing so, this article aims to provoke a rethinking of the role that the doctrine of equivalents plays in patent construction, and to contribute to the development of a more nuanced and critical framework for patent

\textsuperscript{10} See Cotropia, \textit{supra} note 6 at 151. See also Lichtman, \textit{supra} note 8 at 2030-2031, who observes that the doctrine of equivalents plays an important role in extending patent scope to encompass variants that the inventor could not have described at the time of the invention.

\textsuperscript{11} See generally John R Allison & Mark A Lemley, “The (Unnoticed) Demise of the Doctrine of Equivalents” (2007) 59 Stan L Rev 955, Hugh Laddie, “Kirin Amgen - the End of Equivalents in England?” (2009) 40(1) IIC 3, and Waelde et al, \textit{supra} note 1 at 470-472, citing and discussing the case of Kirin-Amgen Inc v Hoechst Marion Roussel Ltd [2005] RPC 9 at para 37 [Kirin-Amgen 2005a]. In contrast, other British commentators have suggested that it is not entirely clear whether there is a distinct doctrine of equivalents in the United Kingdom. See Bainbridge, \textit{supra} note 3 at 536. See also Charles W Adams, “The Doctrine of Equivalents: Becoming a Derelict on the Waters of Patent Law” (2006) 84 Neb L Rev 1113, who notes at 1113 and 1157, that the doctrine of equivalents is “in decline” in the United States and suggests that it has become arcane, increasing uncertainty and imposing significant costs on competitors who cannot predict the scope of the patent. In John R Thomas, “Claim Reconstruction: The Doctrine of Equivalents in the Post-Markman Era” (2005) 87 J Pat & Trademark Off Soc'y 781 at 782, Thomas expresses a similar view, observing that there has been a “recent decline of the doctrine of equivalents”.

interpretation. It seeks to shift the focus of the debate from whether a doctrine of equivalents is needed, to how broadly it should apply in specific cases.

This article will argue that, although there may be variations in how the doctrine is applied in different jurisdictions, there appears, at least at face value, to be a paradigm shift consisting of a convergent trend in the United States, the United Kingdom, and Canada to reject or limit the doctrine of equivalents. Although courts may frown upon referring to “equivalents” as an explicit rhetorical device, this article posits that elements of the doctrine of equivalents remain embedded in the “purposive construction” processes that seek to decipher claim language as a determinant of patent scope. In effect, the doctrine of equivalents remains very much alive, but has been “dressed up” in different terminology by courts. While the doctrine of equivalents has often been criticised for introducing uncertainty into patent construction, abolishing the doctrine entirely would not be feasible from a practical standpoint due to the infelicities of language in capturing with precision the essence of technological innovation.12 In this vein, it has been observed that patent law should protect the invention, not the drafting skills of the legal team which composed the patent claim.13

As such, more attention should be paid to the key challenge facing modern patent law – striking an equitable balance between the interests of the patentee and the promotion of fair competition. This “balancing methodology” is consistent with a “middle course” approach that takes into account the need to read a patent claim contextually by drawing upon, where appropriate, extrinsic material as interpretive aids, without supplanting the patent claim as the key indicator of patent scope. Much time and expense is committed each year to resolving disputes over patent

12 See for instance Lichtman, supra note 8 at 2016, who argues that accurate claim language may not always be within reach of the patent drafter. Lichtman opposes the view propounded by Meurer and Nard that comprehensive claim language is accessible to the patent drafter, and that patentees do not avail themselves of their invention’s full scope by failing to adequately “refine” their claims during patent prosecution. See also Michael Meurer and Craig Nard, “Invention, Refinement, and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents” (2005) 93 Geo LJ 1947.

13 See Paul G Cole, “Patents: purposive construction - Catnic test - Article 69 EPC”, Case and Legislative Comment on PLG Research Ltd v Ardon International Ltd Times and European Patent Convention 1973 Art 69, (1994) 16(12) EIPR, D318-D319, who suggests that the focus of patent law should be on the underlying invention and not on the “personal equation” of the patent attorney.
scope. In this regard, the debate over whether the doctrine of equivalents is still “alive” is unproductive and contributes little to the resolution of real-life patent disputes. Courts and policymakers should instead focus their energies on determining the size of the “innovative increment” required for a variant to avoid infringement, as part of a larger strategy to foster a more harmonious balance between patentees and their competitors in the modern marketplace.

In exploring the future development of Canada’s patent system, this article argues in favour of adopting a variegated, industry-specific approach to the doctrine of equivalents, rather than a “one-size-fits-all” model. By drawing insights from the patent literature of the United States, this article strives to formulate a list of non-exhaustive factors, such as a lengthy “time-to-market” of product development, a high cumulative rate of innovative turnover in an industry, and a pioneering status of an invention, which should favour a more robust scope of protection against “non-literal” variants. It will suggest that these factors should not be studied in isolation, but rather examined holistically when determining how broadly the doctrine of equivalents should apply in ascertaining a specific patent’s “penumbra of protection”. A contextual, industry-sensitive strategy in implementing “equivalents analysis” into the process of patent construction would play a vital role in helping Canada tailor its domestic patent system to incentivise the development of novel, patent-calibre inventions in line with a balanced, “middle course” approach, whilst preserving a reasonably conducive environment for competition and product improvement. Adopting a “middle course” approach would also enable Canada to align its patent construction methodologies with other major trading nations and the European Union, thereby facilitating its transition into an attractive destination for R&D investment and its development into a vibrant knowledge-based economy.

Part I of this article will provide an overview of the normative arguments for and against preserving a doctrine of equivalents in patent law. Part II will situate the approaches of the United States, the United Kingdom, and Canada along the “peripheral claiming-central claiming” continuum, and

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14 See for instance Burk & Lemley, supra note 4 at 1771, where they note that the US patent system in the post-Markman age is not just claim-ridden, but “claim burdened”. See also Lichtman, supra note 8 at 2023-2024, who suggests that requiring patent applicants to draft “perfect” and lengthy patent claims would increase the costs and expenses of patent protection without necessarily enhancing clarity or accessibility.
evaluate the extent to which the doctrine of equivalents survives. Part III will offer some comments on the future trajectory of the Canadian patent system in developing a more nuanced and effective framework for determining how broadly the doctrine of equivalents should apply in industry-specific settings.

II. SKETCHING THE TERRAIN OF PATENT CLAIM CONSTRUCTION METHODOLOGY: FROM “LITERAL” AND “PURPOSVIE” APPROACHES TO “PERIPHERAL” AND “CENTRAL CLAIMING”

At the heart of patent claim construction lie two questions: whether patent protection extends beyond the literal terms of the patent claim, and if so, how to determine the patent’s scope of protection against similar but non-identical variants. In respect of the latter question, an effective doctrine of equivalents or doctrine of “non-literal infringement” would need to enquire into a patent’s scope or “penumbra”\(^{15}\) of protection against after-arising technologies and other competing inventions that perform the same function as the patented invention, but which contain some differences. Ascertaining the patent’s “penumbra of protection” is an essential step in determining whether such after-arising variants are infringing. However, this is by no means a straightforward task.\(^{16}\) Patent claims contain a fair amount of scientific terminology designed to outline the boundaries of a protected technological invention. The open texture of language and the inherent ambiguities present in words introduce a relatively high degree of uncertainty to the claim construction process. In light of this uncertainty, patent scholars are divided as to whether patent scope should be defined

\(^{15}\) A “penumbra” is sometimes used in optical physics to refer to the grey zones or regions that are cast around the darkest central part of a shadow. The concept of the “penumbra” is a particularly apt metaphor for the “area” covered by a patent claim, since the peripheral zone of the patent’s penumbra might extend beyond the literal terms of the claim under a “doctrine of equivalents”.

\(^{16}\) See Waelde et al, supra note 1 at 469, para 11.188: “The question of whether there is infringement is far from straightforward when a rival has produced their own version of an invention aimed at the same technical problem and solving it in similar technical ways, perhaps with similar features,” and also at 470, para 11.190, where they discuss the difficulty of steering a “middle course” in patent interpretation, “one that seeks both certainty and fairness of outcome.”
exclusively by the express terms of the patent or by the actual substance or technical contribution of the underlying invention and whether reference to extrinsic material is permissible. These two approaches sit on opposite ends of the “patent claim construction” spectrum: the former is based on the so-called “peripheral claiming” model, while the latter is founded on a methodology of “central claiming”.

Whether a patent claim ought to be treated as a “signpost” or a “flagpost” in delineating the boundaries of protection is a question that patent interpreters have to grapple with when faced with non-identical variants of a patented invention. These metaphors are often employed in the context of patent interpretation, and relate to whether the text of the patent claim merely serves to indicate the principal features and conceptual essence of the invention (as a “signpost”) or if it strictly defines the outer limits of the patent scope (thereby functioning as a “flagpost”).¹⁷ The late Sir Hugh Laddie once likened this distinction between “peripheral theory” and “central definition theory” to the analogy between a “map” and a “concept”.¹⁸ While a “map” would seek to demarcate with precision the boundaries of the protected subject matter in the case of peripheral claiming, a “concept” would merely explain the underlying principle behind an invention without necessarily circumscribing or enclosing its outer limits.

The signpost / flagpost dichotomy is reflective of the ideological cleavage between central claiming and peripheral claiming. The “sign-post” approach is generally connected with the “central claiming” model, which allows for reference to the patent specification and the nature of the invention’s contribution to the technology concerned in determining the scope of patent protection. The “fence-post” approach, on the other hand, is more closely aligned to the “peripheral claiming” model, which considers the scope of monopoly to be strictly defined and “reined in” by the literal terms of the patent claim. An error or infelicity in language used under the

¹⁷ See for instance Burk & Lemley, supra note 4 at 1772, who describe the difference between central claiming and peripheral claiming in the following terms: for central claiming, the equivalents considered go beyond the language of the claim, while for peripheral claiming, the equivalents must be encompassed by the language of the claim in order to be considered infringing. Burk and Lemley are quick to point out, however, that equivalents would have go to beyond the literal language of the claim to an “outside observer” in either system.

¹⁸ Laddie, supra note 11 at paras 13-14.
peripheral claiming model would consequently have drastic repercussions for the claimant in question, often resulting in the scope of the monopoly being significantly reduced, or even in the invalidation of the patent grant in the event of revocation proceedings.

The terminology used to describe the approach adopted for claim construction may vary from jurisdiction to jurisdiction, but the underlying issues essentially revolve around the appropriate weight to be accorded to the patent claim as an instrument for determining patent scope. Gervais and Judge note, for instance, that both the purposive construction approach, as applied by Canada and the United Kingdom, and the “doctrine of equivalents”, as applied by the United States, seek to identify the appropriate scope of the patent monopoly and to balance fairness to the public and to the inventor. Terminologically speaking, in the United Kingdom, phrases such as “literal reading” and “purposive construction” appear more frequently in the jurisprudence than explicit references to a “doctrine of equivalents”. Interestingly, however, the term “purposive interpretation” in the UK is not generally viewed as synonymous with “central claiming”. One strand of reasoning, as represented by cases such as Kirin-Amgen, suggests that purposive interpretation, like literal interpretation, might simply be a type of peripheral claiming, under which the patent claim defines the scope of protection. The key difference between the literal and purposive approaches – as the UK cases suggest – could lie in how the terms of the patent claim are construed – whether their meanings are based on their strict dictionary definitions, or deduced by context.

However, as shall be argued later in this article, “purposive construction” shares certain features with “central claiming” in that both

20 Ibid.
21 See for instance Kirin-Amgen 2005a, supra note 11, in which the House of Lords endorsed the position that the Catnic purposive interpretation approach was consistent with the European Protocol, but rejected the idea of a general doctrine of equivalents in the UK. In referring to the “doctrine of equivalents” as it had been applied in the United States through cases such as Graver Tank & Manufacturing Co Inc v Linde Air Products Co (1950) 339 US 605 [Graver Tank II], Lord Hoffmann noted at paragraph 37 of the decision in Kirin-Amgen: “It is frankly acknowledged that it allows the patentee to extend his monopoly beyond the claims”.

approaches require a patent interpreter to look beyond the literal definitions of patent terms and to consider the inventive concept, as represented in diagrams or other “external” sources, in order to divine the meanings of words, especially ambiguous words, used in the patent claim. In this respect, the boundaries that purport to distinguish between purposive interpretation, central claiming and peripheral claiming are not clearly defined. Despite their apparently contrasting orientations, both purposive construction and central claiming recognise the possibility of protecting a patented invention against variants which infringe the patent in “non-literal” ways.

Before embarking on a discussion of the various jurisdictional approaches adopted in the treatment of “equivalents” under patent law, it is apposite, at this juncture, to consider the relative merits of the peripheral claiming system of claim construction, that is, the practice of treating the language used in the patent claim as defining the precise boundaries of patent protection.

One of the principal arguments raised in support of the peripheral claiming method is that it provides, or at least seeks to provide, certainty and fair notice to third parties and the public of a patent’s “monopolistic reach”. The peripheral claiming model allows a patentee’s rivals to rely on the terms of the patent claim as exhaustively defining the scope of protection, so that what is not included in the claim is not protected and may be utilised without incurring legal liability. This “public notice” function served by the patent claim would enable competitors to tailor their inventive and commercial activities accordingly so that they do not infringe the protected subject matter under the patent.

Another argument which might be used in support of peripheral claiming is that it facilitates a fair allocation of benefits and burdens between the inventor / patentee and its rivals in technology. The “metes and bounds” approach requires the party with the most intimate knowledge of the invention to “stake out” the limits of the claim, so that other parties can engage in fair competition by “working around” the defined

23 Ibid.
24 See Meurer & Nard, supra note 12 at 2010 and 1949, who argue that the doctrine of equivalents has the potential to harm competition, and lacks a strong normative foundation.
boundaries. Interestingly, unlike copyright protection of literary, musical, artistic and dramatic works, patent rights do not arise spontaneously when a new device or process is invented. Patent grants by a state are based on a regime of compulsory “registration”, contingent upon the successful application, examination and acceptance by the examining authorities of the claimed invention. The structure of patent administration places on the patent applicant the onus not only of describing the claimed invention, but also of demonstrating that it satisfies the requirements of patentability. Taking into account the special responsibility of patent applicants in carving out the contours of the legal protection that they are seeking, an argument might be made that any loopholes or drafting mistakes should be construed against them. In this light, it might be suggested that the scope of the patent monopoly should be strictly confined by the terms of the patent claim, since all the elements that the patentee had hoped to capture in the ambit of protection ought to have been expressly included in the claim language. From a logistical or technical point of view, this special onus might also be justified by the fact that the patentee is often in the most favourable position to provide full details of how the invention works, functions and operates, as well as the variations that the invention is intended to encompass. Advocates of peripheral claiming might accordingly propose that the successful patentee ought to be entitled only to what is expressly claimed, and what is not so claimed is disclaimed and falls outside the scope of protection. Mistakes in drafting which create unnecessary or inconvenient limitations to the ambit of the patent claim would accordingly be the responsibility of the patent drafter, amounting essentially to a “self-inflicted wound”.

Notwithstanding the arguments in the above paragraphs, some doubt has been cast on whether the “bright line approach” inherent in the

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25 This interpretive methodology is consistent with the contra proferentem rule in contract law, which holds that any ambiguities in a contractual term, such as a clause excluding liability, are to be construed against the party who drafted it. For a more detailed discussion, see Ewan McKendrick, Contract Law: Text, Cases, and Materials, 6th ed (Oxford University Press, 2014) at 404.

26 See Canamould, supra note 22, where Layden-Stevenson J. of the Federal Court of Canada held, at para 38, that the patent claim serves as the primary guide for determining the scope of the invention. In this respect, reference may be made to the patent specification to illuminate an ambiguity or to interpret a word in the claim, but not to widen the scope of the monopoly.

27 Ibid at para 38.
Peripheral claiming model actually enhances clarity and certainty in patent law. It has been suggested, for instance, that boundaries based on language are not stable or durable\textsuperscript{28} and that patent interpretation based on peripheral claiming may actually damage innovation.\textsuperscript{29} Even if the patent scope is to be defined exclusively by the terms of the patent claim, disagreements over the meanings of the terms are pandemic, and perhaps inevitable.\textsuperscript{30} Further, patents often cover new forms of technology that do not have a clear definition in the art.\textsuperscript{31} To compound the situation, it has been quite aptly noted by the Supreme Court of Canada that patent claims have “complex layers of definitions.”\textsuperscript{32} Economically speaking, there may not be much benefit in marginally improving patent claim language to fit the peripheral claiming model, since a skilled reader may find it easier to read a simple claim than one that is drafted in abstract, though technically superior, language.\textsuperscript{33} Practically speaking, it is extremely difficult to eliminate all uncertainty from the claim construction process, particularly in the case of pioneering inventions, and a peripheral claiming approach provides no guarantee that objectivity and clarity will be enhanced.\textsuperscript{34} Rather, more emphasis should be placed on clearer and simpler drafting, instead of expecting the patent claim to serve as a comprehensive, “all-encompassing” document. Adopting the latter approach would likely induce drafters to use more abstract language comprising relative or functional words such as “about”, “approximately”, “within the range”, or “substantially”\textsuperscript{35} which would heighten rather than reduce the difficulties and costs of patent interpretation.

The next section of this article will explore the patent construction approaches of three selected jurisdictions – the United States, the United Kingdom and Canada – and situates these three approaches along the “flagpost-signpost” spectrum identified earlier. It seeks to highlight what

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\item \textsuperscript{28} Burk & Lemley, \textit{supra} note 4 at 1749.
\item \textsuperscript{29} \textit{Ibid}.
\item \textsuperscript{30} \textit{Ibid} at 1750.
\item \textsuperscript{31} \textit{Ibid} at 1752.
\item \textsuperscript{32} \textit{Free World Trust v Electro-Santé Inc}, [2000] 2 SCR 1024 at para 15.
\item \textsuperscript{33} Lichtman, \textit{supra} note 8 at 2015.
\item \textsuperscript{34} Toshika Takenaka, “Doctrine of Equivalents after Hilton Davis: A Comparative Law Analysis” (1996) 22 Rutgers Computer & Tech LJ 479 at 504 [Takenaka].
\item \textsuperscript{35} \textit{Ibid} at 505.
\end{itemize}
appears, at least at a superficial level, to be a convergent trend toward peripheral claiming in these three systems, and will offer some thoughts on the significance of this “convergence” for the viability of a “doctrine of equivalents” for contemporary patent law.

III. IS THE DOCTRINE OF EQUIVALENTS ALIVE OR DEAD? A COMPARATIVE HISTORICAL SURVEY OF PATENT INTERPRETATION IN THE UNITED STATES, THE UNITED KINGDOM AND CANADA

A. The Interpretation of Patent Claims in the United States

The doctrine of equivalents has had a long and interesting history in the United States, dating back to Winans v Denmead\(^{36}\), and subsequently applied in Graver Tank & Manufacturing Co. v. Linde Air Products Co. (Graver Tank II)\(^{37}\) and Warner-Jenkinson Co. v. Hilton Davis Chemical Co.,\(^{38}\) both of which endorsed the doctrine.\(^{39}\) The court in Warner-Jenkinson expressed the view that the doctrine of equivalents in the U.S. is to be applied to “individual elements” of the claim and not to the invention as a whole, thereby adopting an “element-by-element” methodology. The doctrine is still generally recognized by courts in that they do not always limit a patentee to the literal meaning of the claims,\(^{40}\) so as to prevent patent protection from becoming a “hollow and useless thing”.\(^{41}\) However, the scope of the doctrine appears to have been limited by developments in the U.S. case law subsequent to Graver Tank II. There are two key decisions in the U.S. jurisprudence that are often cited as evidence of a “diminishing” doctrine of equivalents, namely, the 1996 case of Markman v. Westview Instruments, Inc.\(^{42}\) and the 2003 case of Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki

\(^{36}\) Winans v Denmead [1853], 15 How 330 (US).
\(^{37}\) Graver Tank II, supra note 21.
\(^{40}\) Ibid at 223.
\(^{41}\) Graver Tank II, supra note 21 at 607.
Co.\textsuperscript{43} Festo recognised an exception for prosecution history estoppel, under which elements of a claim which had been abandoned earlier during patent examination cannot later be resurrected as functional equivalents of the patented invention.\textsuperscript{44} Markman, on the other hand, placed restrictions on how the doctrine could be pleaded by mandating a pre-trial hearing during which the scope of the patent claim was to be determined. Determining patent scope was no longer a question of fact to be determined by the jury, but rather a question of law to be resolved by the judge at a designated, pre-trial, Markman hearing.\textsuperscript{45}

It has also been observed in the scholarly literature that the doctrine of equivalents has experienced a gradual but steady decline in the United States.\textsuperscript{46} Commentators such as Adelman and Francione have suggested that the doctrine of equivalents should receive a “proper burial” from the federal circuit.\textsuperscript{47} Allison and Lemley note that the doctrine’s “demise” was

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\item \textsuperscript{43} Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co. (2002), 535 US 722 (Fed Cir US) [Festo].
\item \textsuperscript{44} For a more recent case in which prosecution history estoppel was held to bar the application of the doctrine of equivalents, see EMD Millipore Corp v AllPure Technologies, Inc (2014), No 14-1140 (Fed Cir US).
\item \textsuperscript{45} Prior to 1995, claim construction was “folded” into the determination of issues such as patent validity and patent infringement and such questions would generally go to the jury, although judges would periodically hear patent issues in summary judgments or bench trials. However, after Markman, arguments concerning patent construction, as a matter of law, are heard by judges in a separate, pre-trial proceeding called a “Markman hearing”. See Burk & Lemley, supra note 4 at 1750.
\item \textsuperscript{46} A sense of judicial skepticism toward the doctrine of equivalents can also be observed in cases such as Pennwalt Corp v Durand-Wayland, Inc (1987), 833 F2d 931 (Fed Cir US) (in banc), cert. denied, 108 S Ct 1226 (1988), where the Federal Circuit expressed an awareness that the status of “claims” in patent construction was being diminished or eroded by the doctrine of equivalents. Although the court adopted an “element by element” approach as opposed to an “entirety” (claim as a whole) approach in determining infringement, the judgment did little to resolve the ambiguities present in the doctrine of equivalents. See for instance Martin J. Adelman & Gary L Francione, “The Doctrine of Equivalents in Patent Law: Questions that Pennwalt Did not Answer” (1989) 137:3 U Pa L Rev 673 at 677-678. See also David L Schwartz, “Explaining the Demise of the Doctrine of Equivalents” (2011) 26 BTLJ 1157 and Thomas, supra note 11 at 781, who describes the “increasing disdain with which the Federal Circuit...view[s claims] of equivalent infringement”.
\item \textsuperscript{47} See Adelman & Francione, supra note 46 at 729, who assert that “justice can be done in almost all cases without the use of the doctrine of equivalents”.
\end{itemize}
precipitated by the change in procedure mandated by the Markman decision, such that by the time of Festo, the doctrine was already near death. Burk and Lemley observe that the shift in methodology triggered by Markman has led to a reconfiguration of patent construction in the United States to a system of fence-posts (peripheral claiming) rather than sign-posts (central claiming),\(^48\) a trend which they argue is undesirable.\(^49\) In this respect, modern patent law in the United States treats the scope of an invention as being delineated by what is claimed.\(^50\) The wording of a patent claim functions like the “metes and bounds” of a property deed, and defines the “conceptual fence” that marks the edge of a patentee’s right.\(^51\) Hence, although the doctrine is theoretically still applicable in the United States by virtue of Graver Tank II which remains good law, its scope of application has been severely curtailed (procedurally) by the Markman decision, and (substantively) by Festo in regards to prosecution history estoppel.

But vestiges of central claiming remain in the American patent system.\(^52\) The elements of central claiming “intermingle” with the apparatus of peripheral claiming.\(^53\) Burk and Lemley suggest that there are “hints” of central claiming, even in the present-day “peripheral claiming” system in the United States, which arguably derive their historical origins from the “hybrid model” adopted since the twentieth century.\(^54\) Courts continue to be guided by the rule that the patent claim is to be read in light of the patent specification. This is an element of central claiming as the scope of the patent is not determined solely by the terms of the patent claim, but by, in some cases, reference to illustrative or explanatory paragraphs or diagrams in the specification. However, this rule is qualified by another rule which prohibits courts from importing elements from the specification into the claim.\(^55\) It is interesting to note, in addition, that the US Supreme Court

\(^48\) Burk & Lemley, supra note 4 at 1751.
\(^49\) Ibid at 1748; 1757-1761.
\(^50\) Ibid at 1744.
\(^51\) Ibid.
\(^52\) Ibid at 1766.
\(^53\) Ibid at 1777.
\(^54\) From a historical vantage point, the United States patent system in the 20th century, has, for instance, been characterised as being based on a “hybrid” peripheral claiming model. Ibid at 1770.
\(^55\) Ibid at 1771-2.
acknowledged two different standards for extrinsic and intrinsic evidence when reviewing the patent claim construction judgment of a District Court.\textsuperscript{56} Further, in view of the fact that suitable technical vocabulary may not be available to describe a novel invention, the US Supreme Court “has long recognized that patents cannot only be interpreted by their literal terms.”\textsuperscript{57} This provides a legal justification for the continued preservation of “equivalents analysis”.\textsuperscript{58}

The fact that the peripheral and central claiming rules do not sit comfortably with each other has led Burk and Lemley to describe the US patent system as a “hybrid model” encompassing elements of both peripheral and central claiming.\textsuperscript{59} They advocate the restoration of “central claiming” methodology to the United States patent system, which they suggest has the advantage of being intellectually honest in recognising that the scope of a patent is “muddy” and does not pretend to offer, as the peripheral claiming system seems to do, a “crystalline” standard of clarity.\textsuperscript{60} In this regard, they note that it is unsafe, and perhaps even pretentious, to assume that language can concretely define the outer limits of a patent monopoly.\textsuperscript{61} The inadequacies of natural human language in capturing the essence and nuances of an invention are elegantly summed up in the dictum by the court in \textit{Autogiro Co. of America v. United States}: “Things are not made for the sake of words, but words for things.”\textsuperscript{62} It has also been observed that

\begin{footnotesize}
\begin{enumerate}
\item In \textit{Teva Pharm USA, Inc v Sandoz, Inc}, (2015), 135 S Ct 831 (13 PTD, 1/21/15), it was held that a “de novo” standard was appropriate for reviewing intrinsic evidence, while a “clear error standard” was to be used for reviewing extrinsic evidence.
\item Ibid.
\item Burk & Lemley, supra note 4 at 1770.
\item Ibid at 1794.
\item Ibid at 1795.
\item \textit{Autogiro Co of America v United States} (1967), 384 F 2d 391 (Ct Cl US) at 397. See also Robert P Merges, Peter S Menell & Mark A Lemley, \textit{Intellectual Property in the New Technological Age}, 6th ed. (New York: Wolters Kluwer Law and Business, 2012), who note at 328 and 336 that “the English language lacks the numerical precision... [of] geophysical measurement” and that the “nature of language makes it impossible to capture the essence of a thing in a patent application”. See also Lichtman, supra note 8 at 2023-2024, where he notes that attempts to capture future variants in a patent claim might result in more abstract drafting. For example, instead of describing a tennis shoe with laces, an inventor might be driven to claim a “mechanism to bind and relax” the
\end{enumerate}
\end{footnotesize}
the doctrine of equivalents, which plays an important role in the central claiming approach, helps to ensure that outdated terminology in a patent claim does not provide infringers with an “unfettered licence to exploit and appropriate patented technologies”.\(^\text{63}\) This has important implications for after-arising technologies which are based essentially on the patented invention, but with structural variations which perform the same function.\(^\text{64}\) A doctrine of equivalents would ensure that patentees are not unfairly penalized for choosing words or claim language that falls out of fashion after the patent grant is awarded.\(^\text{65}\)

An additional point that should be made relates to the procedural impact of cases like Markman and Festo on the doctrine’s perceived demise. It is important to note that neither Markman nor Festo was specifically designed to abolish the doctrine of equivalents entirely. For starters, the purpose of Markman was not to confine the scope of a patent to its strict, literal reading, but rather to effect a *procedural* change to the hearing of disputes concerning patent interpretation. The main change wrought by Markman consisted of having a judge resolve the issue of patent scope as a question of law at a pre-trial hearing, arguably to streamline the process and the administration of evidence prior to the infringement action. Hence, the separate “Markman proceeding” to determine patent scope is likely to result in a consistent finding for infringement and validity, simply because the same decision maker is involved in deliberating both issues, and not a result of the doctrine’s abolition.

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shoe to a human foot. The extra verbiage involved in trying to draft a perfect claim imposes extra costs on the drafter and the reader parsing through it.

\(^\text{63}\) See Merges, Menell & Lemley, *supra* note 62 at 351, citing Justice Rader’s partially dissenting judgment in Festo, *supra* note 43.

\(^\text{64}\) For example, the development of transistor technology in the late 1940s led to the replacement of the outdated terms “anode” and “cathode” from tube technology with electron collectors and emitters. See for instance Cotropia, *supra* note 6 at 151.

\(^\text{65}\) See Anthony H Azure, “Note: Festo’s Effect on After-Arising Technology and the Doctrine of Equivalents”, (2001) 76 Wash L Rev 1153, who notes that interesting difference in treatment between unamended patent claims and amended patent claims under the rule in Festo. On the one hand, unamended claims continue to enjoy protection against after-arising technology. On the other hand, claims that have been amended over the course of patent prosecution would lose their protection against after-arising technologies under the doctrine of equivalents, a situation which Azure characterises as unfair to owners of amended claims.
Festo, on the other hand, laid down a qualification to the doctrine of equivalents, whereby claim elements that had been abandoned earlier by the patentee during patent prosecution to avoid the consequences of invalidity could not subsequently be “revived” or included as part of an infringement claim under the doctrine of equivalents. Festo thus limits the applicability of the doctrine in cases where a patent claim has been narrowed to avoid capturing elements of the prior art, thereby disallowing a patentee from claiming a variant that had previously been jettisoned over the course of the patent’s “prosecution history”. These two cases are more appropriately viewed as procedural or exceptional restrictions to the practical application of the doctrine rather than representing its wholesale abolition from the principles of patent law in the United States. Festo and Markman have merely limited the expression of the doctrine as it has been articulated in Graver Tank II, and continue to allow, at least from a substantive standpoint, for the essence of an invention to transcend the literal language of a claim in cases involving trivial alterations of a patented invention. The system continues to be receptive to arguments based on central claiming, and elements of that methodology continue to find expression despite the procedural limitations imposed by recent decisions on patent construction in the United States. Instead of abrogating the doctrine of equivalents, it might be argued that Festo, in particular, implicitly acknowledges the role of the doctrine in patent interpretation by stipulating the exceptional circumstances when the doctrine does not apply. It is therefore important to read these two cases in an appropriate light when evaluating their ultimate impact on patent interpretation in the United States.

Further, although there appears to be an increasing alignment between the United States and the United Kingdom toward what is known as the “peripheral approach” to claim construction, courts in the United States have not completely rejected the doctrine, even though its application has been limited by cases such as Markman and Festo. That elements of the doctrine continue to be relevant in claim construction, particularly in ascertaining the scope of technical terms in pre-trial hearings, suggests that it may be premature to sound the “death knell” for the doctrine of equivalents.66 The doctrine may have been restricted by procedural

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developments in US patent law, but it continues to play a role in outlining the boundaries of a claimed invention, such as in cases of “non-literal infringement” involving after-arising technologies.\textsuperscript{67} A peripheral claiming system does not, therefore, entirely preclude the operation of a doctrine of equivalents. Burk and Lemley suggest that it seems plain to the outside observer that, whether under a peripheral claiming system or a “signpost” system, there are elements of “central claiming” present which allow an interpreter to look beyond the literal terms of the patent claim in each case. In recognising that “equivalents go beyond the claim”, one is acknowledging that there are elements of the doctrine of equivalents which remain embedded in the process of claim construction, imbuing the scope of protection with a “penumbra” that extends beyond the literal terms of the patent claim.

B. The Interpretation of Patent Claims in the United Kingdom

Although the terminology used to describe the methodology of claim construction in the United Kingdom might differ from that of the United States,\textsuperscript{68} the ideological cleavage between peripheral claiming and central claiming manifests itself to some degree in the vocabulary of “literal construction” and “contextual” or “purposive construction”. Despite these differences in terminology, the dilemma of whether, and to what extent, “variants” should be included within the patent scope is a common concern.\textsuperscript{69} Quite interestingly, there appears to be a shared skepticism of ascertaining the breadth of patent claims and for distributing rewards for achievement in innovation.

\textsuperscript{67} It has also been observed that the doctrine of equivalents continues to play an important role in the enforcement of patent rights in certain industries, such as litigation involving patented pharmaceutical products. See generally Janet Freilich, “The Paradox of Legal Equivalents and Scientific Equivalence: Reconciling Patent Law’s Doctrine of Equivalents with the FDS’s Bioequivalence Requirement” (2013) 66 SMU L Rev 59.

\textsuperscript{68} It has been suggested in the jurisprudence that the main difference between the approaches in the US and the UK is that in the US all elements are treated as “material”, instead of “essential” or “non-essential”. See Free World Trust, supra note 32 at paras 28-29, 38 and 55 and Graver Tank II, supra note 21 (per Thomas J) at 29.

\textsuperscript{69} See Burk & Lemley, supra note 4 at 1777, who note that in the UK, the peripheral claiming model is adopted in principle (nominally), but rarely with the literalism of the US position.
“equivalents” analysis in both jurisdictions, and a shift toward treating the patent claim as the primary determinant of an invention’s boundaries. Yet despite these seemingly “convergent” trends, the Catnic approach in the United Kingdom remains mired in algorithmic rigidity, obfuscating the process of claim construction. Buried in this algorithmic complexity remain vestiges of “equivalents” analysis, which suggests that underneath the semantic differences which distinguish the two jurisdictions lies a “kernel” of common truth – that claims can capture variants outside their literal terms – a principle that underpins what it means to enjoy patent rights in a modern intellectual property regime.

The trend by courts in the United Kingdom to avoid strict literalism in patent construction predates the European Patent Convention. In the late 19th century, courts began to formulate and apply a “pith and marrow” approach to address situations involving trivial, colourable or immaterial variations to a patented invention. The main question behind this approach lies in determining whether the invention and the allegedly infringing device/process differs in essential or non-essential ways. In order for a variant to be infringing, it must have taken all the “essential integers” necessary for the patented invention to perform its function. If all the

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70 Some authors have suggested that although the term “equivalents” is sometimes employed in the UK to refer to infringing variants that are based on the same inventive concept as the patented invention, this is not to be confused with the phrase “doctrine of equivalents”, which embodies a particular test for infringement in the United States. See for instance Waelde, et al., supra note 1 at 472 at para. 11.195. Despite the potential that UK patent law offers in respect of protecting against infringements of a non-literal nature, UK courts have generally not been sympathetic to the idea of a general “doctrine of equivalents”, as seen in cases such as Kirin-Amgen Inc and others v Hoechst Marion Roussel Ltd and others [2005] 1 All ER 667 [Kirin-Amgen 2005b].

71 See Tanya Aplin & Jennifer Davis, Intellectual Property Law: Text, Cases and Materials, 2nd ed. (New York: Oxford University Press, 2013) at 717, where they suggest that the shift from literalism or the “fence-post” methodology toward purposive claim construction began even before the Protocol to Art 69 of the EPC.

72 See Clark v Adie (1877) 2 App Cas 315, per Lord Cairns. The pith and marrow approach was endorsed and applied in a number of subsequent cases, including Van der Lely NV v Bamfords Ltd [1963] RPC 61 [Van der Lely NV], where it was unanimously held by the House of Lords that the approach remained a part of English law. See also Laddie, supra note 11 at 19, para 42 and Bainbridge, supra note 3 at 527. The status of this approach was, however, modified by the implementation of the Patents Act 1977, passed pursuant to the entry into force of the European Patent Convention. See also Bainbridge, ibid at 528, and Aplin & Davis, supra note 71 at 716.
essential integers have been adopted by the variant, then infringement would still occur even if there were differences in the non-essential integers.\textsuperscript{73} The key challenge facing patent drafters under the “pith and marrow approach” was to avoid unduly narrow drafting (which would allow minor variations to fall outside the patent scope) whilst ensuring that the claim was not so broad as to capture (unprotectable) elements of the prior art.\textsuperscript{74} The “pith and marrow approach” generated a number of conflicting decisions,\textsuperscript{75} and its ability to provide clear cut guidance to patent drafters has been doubted in the scholarly literature.\textsuperscript{76}

The “pith and marrow” approach was subsequently deemed to be no longer appropriate and was to be replaced by the method of “purposive construction”, as held by the court in \textit{Catnic Components Ltd v Hill & Smith Ltd}.\textsuperscript{77} Lord Diplock in \textit{Catnic} disapproved of a “purely literal” approach to patent claim construction derived from “the kind of meticulous verbal analysis in which lawyers are too often tempted by their training to indulge.”\textsuperscript{78} Instead, the appropriate question to ask was whether the skilled reader in the field would understand that strict compliance with a certain word or phrase in the patent claim was intended by the patentee.\textsuperscript{79} This pronouncement by Lord Diplock leaves open the possibility that purposive construction may result in a word in a patent claim being given a meaning other than its strict literal meaning, in cases where it can be shown that strict literal interpretation was not intended by the patentee. The approach advocated by Lord Diplock was later endorsed and re-articulated as three

\textsuperscript{73} Bainbridge, \textit{ibid} at 527.
\textsuperscript{74} \textit{Ibid} at 527-28. See also Viscount Radcliffe in \textit{Van der Lely NV, supra} note 72 at 78.
\textsuperscript{75} See for example \textit{Marconi v British Radio Telegraph & Telephone} (1911) 28 RPC 181 (where the use of a two-coil transformer was held to infringe an invention with an auto-transformer because the auto-transformer was not an essential integer) and \textit{Rodi & Wienesberger AG v Henry Showell} [1969] RPC 367 (where a C-shaped bow on a watch strap did not infringe an invention with a U-shaped bow, the latter being an essential integer), discussed in Bainbridge, \textit{ibid}. at 528.
\textsuperscript{76} Bainbridge, \textit{ibid}. See also Waelde et al, \textit{supra} note 1 at 470, footnote 357, where they describe the “pith and marrow” approach as a “rather vague approach of stripping the invention down by the removal of ‘immaterial’ or ‘non-essential’ features or integers” in order to ascertain what the alleged infringer had taken.
\textsuperscript{77} \textit{Catnic Components Ltd v Hill & Smith Ltd}, [1982] RPC 183.
\textsuperscript{78} \textit{Ibid} at 243.
\textsuperscript{79} \textit{Ibid}.
questions by Hoffmann J in *Improver Corp v Remington Consumer Products Ltd* as the “Catnic / Improver questions” or simply the “Protocol questions”, because they were perceived as being compatible with the Protocol on the Interpretation of article 69 of the *European Patent Convention*.

In surveying the historical evolution of patent interpretation in the United Kingdom, there appear to be at least two strands of argument in the literature – the first represented by the late Sir Hugh Laddie and the second by Lord Hoffman in *Kirin-Amgen* (the latter of which was endorsed by subsequent commentators such as Pumfrey and his co-authors). Laddie faults Lord Hoffman for misstating, in *Kirin-Amgen*, the early position in the UK as being driven by “strict literalism”. He argues that there were no patent claims in the early days, and therefore all claims had to be construed contextually. The point of contention, therefore, lies in whether the earliest approaches in the UK were driven by strict literalism or contextualism. On the one hand, Laddie suggests that “contextualism” is not new, and is a methodology for claim construction that has had a long history in the patent jurisprudence of the UK. Pumfrey and his co-authors argue, on the other hand, that Lord Hoffman’s views will prevail because his pronouncements were made in a judicial capacity. However both strands agree that patent claims in the post-*Catnic* era are to be interpreted according to the principles

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81 The three questions in particular were dubbed the “Protocol questions” by the Court of Appeal in *Wheatly v Drillsafe Ltd* [2001] RPC 133 at 142, and have been used by the English judiciary as a framework to determine whether variants are captured by the patent claim and therefore infringing.

82 The three questions articulated by Hoffmann J are as follows:

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

2) Would the absence of a material effect have been obvious to the skilled reader at the date of publication of the patent? If no, the variant is outside the claim. If yes,

3) Would the skilled reader nevertheless have understood from the language of the claim that the patentee intended strict compliance with the primary meaning was an essential requirement of the invention? If yes, the variant is outside the claim. See the *Improver* case [1990] FSR 181 at 189.

83 The view that strict literalism has been eschewed by UK courts for some time also finds favour in the work of David Bainbridge. See for instance Bainbridge, *supra* note 3 at 527, citing Lord Reid in *Rodi & Wienenberger AG v Henry Showell Ltd* [1969] RPC 367 at 378.
of purposive construction, as articulated by Lord Diplock.\textsuperscript{84} There is consensus between these two strands that the current position in the UK rejects any general role for the doctrine of equivalents, and this position is perceived as being consistent with the approach under Art 69 of the EPC. Laddie argues, for instance, that UK patent law has developed since the pre-
\textit{Catnic} days of the “pith and marrow approach” and is currently closer to the standard articulated in the EPC. Another view, adopted by Jonathan Turner, is that \textit{Catnic} is out of touch with the EPC, and imposes unduly rigid restrictions on the textual interpretation of patent claims.\textsuperscript{85} Bainbridge observes, however, that although the compatibility of \textit{Catnic} with the EPC Protocol was challenged in \textit{obiter dicta} in \textit{PLG Research Ltd v Ardon International Ltd},\textsuperscript{86} this attack did not last long, and subsequent cases\textsuperscript{87} have upheld the relevance of \textit{Catnic} in the post-Protocol era.\textsuperscript{88}

Judges in the United Kingdom, particularly post-\textit{Catnic}, have ostensibly evinced a sense of skepticism, and perhaps even hostility, toward the doctrine of equivalents.\textsuperscript{89} This hostility is somewhat surprising, given the fact that Article 2 of the \textit{Protocol on Interpretation of Article 69 in the European Patent Convention 2000} specifically requires that “due account” be taken of “any element which is equivalent to an element specified in the claims” when determining the scope of protection of a European patent. Despite the presence of Article 2, Lord Hoffman famously observed that the doctrine of equivalents can be eliminated through a process of purposive construction. He denied a need for UK courts to follow in the footsteps of


\textsuperscript{86} \textit{PLG Research Ltd v Ardon International Ltd}, [1995] FSR 116.

\textsuperscript{87} See for instance \textit{Assidoman Multipack Ltd v Mead Corp} [1995] FSR 225, where Aldous J held that the PLG Research case was distinguishable and that \textit{Catnic} was compatible with the Protocol.

\textsuperscript{88} See Bainbridge, \textit{supra} note 3 at 530. Bainbridge also suggests, at 529, that \textit{Catnic} “still holds true” and properly gives effect to the Protocol.

\textsuperscript{89} Bainbridge offers a more circumspect view, suggesting that the law on infringement by equivalents is not settled, and it is debatable whether there is a distinct doctrine of equivalents in the law of the United Kingdom. See \textit{ibid} at 536.
the United States by applying the latter’s version of the doctrine of equivalents, suggesting that the same result could be reached in patent construction by simply “reading the claims”. It has also been suggested in the case law and literature that there is no doctrine of equivalents in the United Kingdom. Laddie has suggested, in this vein, that once strict literalism or “acontextual literalism” was abandoned, there was no longer a need for a doctrine of equivalents.

Although there is some disagreement in the characterisation of the approach in the UK vis-à-vis the EPC model, the general consensus, both in the case law and in the commentary, appears to be that there is no role in the UK for any doctrine which extends the scope of protection beyond the terms of the patent claim, contextually interpreted. Interestingly, although Lord Hoffman endeavoured to distinguish the UK model from that the United States, the differences seem, on closer examination, to be rather cosmetic. At the outset, the doctrine of equivalents appears to have been restricted by fairly recent developments in the case law. These trends in the UK jurisprudence arguably mirror those in the United States in spirit if not in form. Judging from the cases alone, one might observe, at least at a superficial level, signs that the doctrine of equivalents is approaching its “demise” on both sides of the continent.

An important issue which remains, however, is whether it is practically feasible, or indeed, even possible, for a “contextual interpretation” to be

90 See Kirin-Amgen v Hoechst Marion Roussel Ltd. [2004] UKHL 46, at para. 44 [Kirin-Amgen 2004].

91 See for instance Laddie, supra note 11 at paras 58 and 61, discussing how the primacy of the claim was emphasized throughout the judgment in Kirin-Amgen, leaving little room for modifying the actual language of a patent claim.

92 “Acontextual literalism” would refer to a methodology of construction that strictly interprets the text of a document, without reference to or reliance on its context or purpose.

93 See Laddie, supra note 11 at para. 18, where he notes that “acontextual literalism” was replaced by a new kind of literalism – “contextual literalism”. He applauds the continued requirement of “literalism”, which in accordance with Art 69 of the European Patent Convention, “firmly shuts the door on any doctrine which extends protection outside the claims”. He observes as well, in the context of the Festo litigation in the United States, that: “American patent litigants pay dearly for results which are no more just or predictable than could be achieved by simply reading the claims”.

94 See for instance the case of Kastner v Riea and another [1995] RPC 585, as well as the discussion in Waelde et al, supra note 1 at 474, para 11.197.
strictly limited to the terms of the patent claim. As a question of semantics, requiring a purposive construction of a legal document to be circumscribed by the text used to draft it might very well be a contradiction in terms. If the UK purposive approach is capable of reaching the same result without expressly invoking the “US version” of the doctrine of equivalents, then elements of “central claiming” may simply be embedded in the UK’s purposive construction model as it is in the United States. In this regard, “purposive construction” and the “doctrine of equivalents” may very well be two different ways of describing a process of claim construction which recognizes the limits of literal interpretation, and which allows, in appropriate circumstances, the essence of an invention to transcend its strict literal terms and to capture “trivial” or “non-material” variants within its scope of protection. It might therefore be less productive to engage in lengthy debates about the ontological status of the doctrine of equivalents, than to examine the practical impact of claim construction on the extent of protection. Simply because a judge does not make specific mention of a doctrine does not mean that the underlying principles do not find expression in the reasoning underpinning the decision.

In any event, post-Catnic case law in the United Kingdom has demonstrated that protection does extend beyond the literal terms of the patent claim where minor variants are concerned. Where the variant is so trivial that its substituted components add no technical value to the way in which the invention works, patent law considers such a variant infringing

95 See Lionel Bently & Brad Sherman, Intellectual Property Law, 4th ed (Oxford: Oxford University Press, 2014) at 631. Bently and Sherman note that the purposive approach simply requires that patents be interpreted through the eyes of the person skilled in the art. How broadly the claims will be read in a given case will invariably depend on the approach adopted by the skilled person in the case at hand, which is in turn influenced by the purpose of the invention and the way in which the claims are drafted. This allows for the possibility that a patent claim can “capture” elements that are not included within its literal terms, if the skilled reader is of the view that the patent claim was not intended to be construed literally.

96 See for instance Dyson Appliances v Hoover [2001] RPC 26, where a bagless vacuum cleaner with a trumpet-shaped part was held to infringe a patented vacuum cleaner which employed a frusto-conical shaped part instead. On the facts, the trumpet-shaped part and the frusto-conical part were considered geometric equivalents and the difference in shape had no effect on how the invention worked in practice. As such, there were no convincing grounds on which to base an assumption that the patentee intended strict literal compliance with the terms of the patent claim. See also Bainbridge, supra note 3 at 537.
even if it falls outside the literal language of the claim. Claims that are drafted in unnecessarily narrow language are not necessarily penalized where trivial or minor variants are concerned. Thus, in the 2009 case of Virgin Atlantic Airways Ltd. v Premium Aircraft Interior UK Ltd., the Court of Appeal pronounced that there was no general doctrine of equivalents in the patent law of the UK, but also accepted the possibility that a “technically trivial or minor difference” in an element of an allegedly infringing variant might still fall within the meaning of the element in the patent claim when read purposively. Bently and Sherman suggest that reading the claims “in context” quite simply acknowledges the presence of a doctrine of equivalents – in all but name.

Therefore, in comparing the positions of the United Kingdom and the United States, reading a claim “purposively” rather than through a “doctrine of equivalents” may very well constitute a variation in form rather than substance. Both the United States and the United Kingdom adopt approaches that allow a claim (particularly its ambiguous clauses) to be interpreted in context, by referring to details or explanations in the specification or other appropriate material. Even though the prospects of “expanding” the scope of a claim beyond its strict literal terms may be limited to specific cases, the process of determining the “penumbra” of a patent’s reach is embedded in both models, possibly in a latent or nascent form, even though the terminology employed may vary. This suggests that it may be premature to sound the death knell for the doctrine of equivalents, even though judges might be reluctant to expressly acknowledge its embedded influence in the process of patent interpretation.

C. The Interpretation of Patent Claims in Canada

Like the United States and the United Kingdom, elements of equivalents analysis appear to be embedded in Canadian patent interpretation methodology. The regime of patent construction in Canada appears to consist of a hybrid system which combines elements of both the

98 Ibid at para 5.
99 See Bently & Sherman, supra note 95 at 634, who write, in the context of the holding in the Virgin Atlantic Airways case: “In a strange (literal) reading, this is said not to be because there is a doctrine of equivalents; rather, it is because it is the fair way to read the claims in context – a doctrine of equivalents in all but name.”
pre-Catnic “pith and marrow” approach (namely the essential / non-essential test) and the post-Catnic “purposive construction” approach.  

Although these two approaches have been distinguished in the United Kingdom, it will be argued that they are, in fact, not incompatible with each other. The Canadian model shares many similarities with the UK patent system, placing emphasis on the patent claim as outlining the contours of patent construction. However, as in the case of the UK, elements of the doctrine of equivalents inform and animate the process of patent construction and interpretation in Canada.

Guidance on the issue of patent construction in Canada can be found in a number of recent decisions of the Supreme Court, the Federal Court of Appeal, as well as practice notes from the Canadian Intellectual Property Office (CIPO) on purposive construction. In *Canada (Attorney General) v Amazon.com Inc.*, it was noted that the Supreme Court jurisprudence of Canada “requires the Commissioner’s identification of the actual invention to be grounded in a *purposive construction* of the patent claims” (emphasis added). In the case of *Free World Trust v Electro-Santé Inc* (“*Free World Trust*”), for instance, it was held by the Supreme Court that a patent claim was to be given a purposive interpretation, to give effect to the patentee’s “intended meaning”, as determined by the skilled reader on the date of publication of the patent application. This intended meaning relates to the invention’s purpose, whether expressly or implicitly communicated by the drafter in the patent claim. The court further enunciated an essential / non-essential test, emphasizing that infringement would occur if a non-essential element of the patented invention had been substituted. However, a third party could avoid infringement if an essential integer of the invention had been replaced with another element in the accused device, thereby materially changing the way the accused device works or modifying the underlying technology.

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100 See *Free World Trust*, *supra* note 32 at paras 28-29 and 38.


102 *Canada (Attorney General) v Amazon.com Inc*, 2011 FCA 328.

103 *Free World Trust*, *supra* note 32 at 1050 at para 44.

104 *Ibid* at 1053-4, paras 50-52.
The invention at stake in *Free World Trust* concerned the bombardment of the human body with electromagnetic waves, using a form of technology involving circuitry. The defendant’s device employed a different mode of control – a microcontroller, rather than circuitry. The Supreme Court affirmed the Court of Appeal’s finding of no infringement, and held that the mode of control was an essential element of the patented invention. The use of a microcontroller constituted a completely different technology that fell outside the scope of the patent claim. Applying a purposive approach to construction, the Supreme Court held that patent claims cannot be stretched to encompass substantially different variants, even if the ultimate purpose or end result of the variant is identical to that of the patented invention.

The purposive approach was also applied and endorsed in the case of *Whirlpool Corp v Camco Inc* (“Camco”), which was released concurrently the same year. In the case of *Camco*, the patented invention consisted of a dual action agitator for washing machines. The agitator in question contained a shaft whose lower portion had an oscillatory movement to generate a scrubbing effect, with an upper sleeve housing a helical augur. The patentee held three patents in respect of this agitator – one version of which was powered by a drive shaft, while a second employed the use of a clutch mechanism. These two patents were in respect of agitators with rigid vanes. In the third patent, the rigid vanes were substituted with flexible vanes, and the device also offered a choice of drive mode between continuous and intermittent agitation. Although the evidence was not entirely satisfactory, it was accepted by the Federal Court of Appeal that the accused device had infringed the “continuous drive” claims of the patentee. The Supreme Court upheld the Federal Court of Appeal’s finding of fact, and endorsed the “purposive construction” approach for issues for validity and infringement. Under this approach, a trial judge considering such issues would be permitted to look at the specification and drawings for guidance, but was to give primary importance to the terms of the claim when defining the scope of the invention.

Although *Free World Trust* and *Camco* produced two opposite outcomes – with a finding of no infringement in the former and a finding of infringement in the latter – the two cases applied a common principle of patent interpretation. The process of construing a claim involves an

identification of the “essential elements” of the invention as expressed in the words of the claim, interpreted knowledgeabley with the help of the skilled reader, and taking into account the context of the specification as a whole. While the exercise of interpretation is directed by the words of the claim, the underlying objective is to give effect to the patentee’s intended meaning, and to strike a balance between the interests of the patentee and the public. This reasoning is consistent with the “middle course” approach to patent construction. By incorporating elements of the “pith and marrow” approach with purposive interpretation, the holdings in Free World Trust and Camco appear to suggest that the two modes of patent construction are in fact compatible with each other.

In adhering to the spirit of the earlier decisions, the subsequent Canadian case of Canamould Extrusions Ltd. v Driangle Inc.\(^\text{106}\) also endorsed the doctrine of “purposive construction”. Interestingly, the court in Canamould also employed language that implied sympathy for the “pith and marrow” approach by underscoring the importance of distinguishing between essential and non-essential elements of a patented invention. The Federal Court of Appeal articulated a “substitution test” in determining whether a variant falls within the scope of the patent monopoly. In keeping with Free World Trust, the Federal Court of Appeal held that substitution or replacement of an essential element takes the variant outside the scope of protection, while substituting or omitting a non-essential element will not be fatal to the patentee’s claim of infringement. However, the court emphasised that whether an element is considered “essential” hinges upon the words of the claim. A “substitutable” element must therefore clearly be presented in the claim as an ingredient that was not intended to be essential to the working of the invention. Although the contours of protection remain focussed on the language used in the patent claim, the court’s analysis indicates that strict literal adherence to the terms of a patent claim need not be present in all cases of infringement, which again implies sympathy for a “middle course approach” that is potentially accommodative of “equivalents”-type analysis in infringement proceedings.

Based on the above analysis, it would appear that the Canadian approach to patent construction consists of a fascinating hybrid of the “pith and marrow” approach (the pre-Catnic approach in the United Kingdom) and the purposive construction approach (compatible with the tests

\(^{106}\) Canamould, supra note 22.
formulated in the post-Catnic epoch). The Canadian courts appear to have embraced the “pith and marrow” analysis, whilst simultaneously expressing approval of the British doctrine of “purposive construction”.  

The constitution of this Canadian “hybrid” system – which weaves both strands together into a doctrine of patent construction – appears to be at odds with the assertion by UK courts that purposive interpretation is incompatible with both the pith and marrow approach and the doctrine of equivalents. As mentioned earlier, it was proposed in the UK case of Kirin-Amgen v Hoechst Marion Roussel¹⁰⁸ that the doctrine of equivalents is now obsolete and has been replaced with a “purposive construction” approach based primarily on the terms of the patent claim. This is also part of a somewhat awkward attempt in the UK case law to suggest that the pre-EPC case law is consistent with Art 69 of the Protocol, and that the Catnic / Improver formulation is consistent with the provisions of the European Patent Convention.

Interestingly, the Canadian cases since Catnic and Improver have drawn extensively on the UK jurisprudence. For example, in the case of Eli Lilly & Co v Novopharm Ltd,¹⁰⁹ the Catnic test was cited with approval by the Federal Court of Canada. In addition, recent Canadian cases such as Eli Lilly & Co. v. O’Hara Manufacturing Ltd.¹¹⁰ and Canamould Extrusions Ltd. v. Driangle Inc.¹¹¹ have also endorsed the Catnic / Improver test. This suggests that patent claim interpretation in Canada is based upon and therefore consistent with the purposive construction approach in the UK. If one were to accept the assertion by the English judiciary that there is no place for a doctrine of equivalents in British patent law, it might be inferred that the doctrine is as “dead” in Canada as it is in the UK.¹¹² This is of course illogical, since the

¹⁰⁷ See for instance Marconi v British Radio Telegraph & Television Co, (1911), 28 RPC 181 (Ch D), at 217; Free World Trust, supra note 32 at para 28-29; and Beecham Canada Ltd v Procter & Gamble Co (1982), 61 CPR (2d) 1, which endorse the “pith and marrow” essential-elements approach. In particular, the purposive construction approach was given specific emphasis in Free World Trust at para 55. These cases are viewed as consistent with the UK decisions in Catnic and Improver. See also Gervais & Judge, supra note 19 at 782 and 788.

¹⁰⁸ Kirin-Amgen 2004, supra note 90; Kirin-Amgen 2005a, supra note 11.


¹¹¹ Canamould, supra note 22.

¹¹² The Supreme Court of Canada in Free World Trust, supra note 32, expressed the view,
“middle course” approach adopted in Canada is not based on strict literalism, and accommodates the possibility that a patent examiner may need to look beyond the patent claim in order to interpret its terms accurately and coherently.\(^{113}\) Equivalents-analysis is therefore embedded in a “middle course” approach and so it would be contradictory to suggest that a claim must be interpreted purposively whilst asserting in the same breath that patent law has no room for any doctrine of equivalents.

In addition, it is by no means settled that the doctrine of equivalents is really “dead” in the UK, notwithstanding the judicial assertions to that effect. Despite the claims made by judges and academics that the doctrine of equivalents has met its demise in the UK, a closer examination reveals that the algorithmic structure of the Catnic / Improver test continues to preserve certain aspects of “equivalents analysis”, even if the doctrine is not expressly embraced. First, the stages of the Catnic / Improver formulation recognise the possibility that a variant which does not have a material effect on how a device or process functions can fall either within or beyond the scope of the patent claim. Where the variant falls would depend on whether the patentee in question intended strict literal compliance with the patent claim, as set out in the third stage of the test. This indicates that in the majority of situations where strict literal compliance is not intended, the patent scope might be broad enough to encompass the variant. Therefore, even when applying the Catnic / Improver framework in its rigid algorithmic form, the penumbra of protection against infringement extends in some instances beyond the strict literal confines of the patent claim to include devices which deviate so slightly from the original that their technical effect is the same for the purpose of patent protection. As in Canada, it is difficult to conceive of a purposive regime of claim construction in the UK that is

\(^{113}\) It has been suggested that Canadian patent law favours a “balanced” approach to the protection of past innovation while encouraging future innovation, tempered by what one commentator likens to “proportionality analysis”. This approach is characterised as a more moderate system of patent protection that takes into account the public interest and the preservation of fair competition. See Mark Witten, “US Supreme Court Looks North to More Balanced, ‘Canadian-style’ Patent Law System: Kathleen Sullivan keynotes 2014 Patent Law Colloquium”, December 1, 2014, online at: <www.law.utoronto.ca/news/us-supreme-court-looks-north-more-balanced-canadian-style-patent-law-system>. 
entirely hostile to the notion of protection against infringing equivalents in patent law.

Based on the analysis above, it might be somewhat premature to sound the death knell for the doctrine of equivalents in either the United Kingdom or Canada, given the implicit, but still pertinent, role that the tests for essentiality and substitutability still play in patent interpretation in both jurisdictions.

IV. TOWARD A “MIDDLE COURSE” APPROACH TO PATENT CONSTRUCTION: WHICH WAY FORWARD FOR CANADA?

A. Breaking Free from the Strictures of the *Catnic / Improver* Test for Infringement

Any attempt to recalibrate a patent system toward a more prominent recognition of central claiming would necessarily mandate a paradigm shift in patent claim construction toward an “EPC-friendly”, “middle course” approach. Such a shift would play a concrete role in expressly acknowledging the techniques of claim interpretation that are already embedded, though perhaps in a submerged form, in the Canadian patent system. This section will focus on two specific priorities in reorienting Canada’s patent system to be more accommodative of “equivalents analysis”. The first priority relates to the importance of breaking free from the strictures of the *Catnic / Improver* questions as a test for infringement, while the second consists of a contextual, industry-sensitive approach to evaluating the scope of patent protection against variants.

Turner has argued that the *Catnic / Improver* test is incompatible with the EPC and is in fact not binding on courts in the United Kingdom.\(^{114}\) Since the *Catnic* case was decided prior to the EPC and its Protocol, it would be erroneous, in Turner’s view, to treat it as a binding precedent.\(^{115}\) Despite claims in subsequent case law, such as *Kirin-Amgen*, that the *Catnic / Improver* approach can be preserved because it is consistent with the EPC, Turner points out that post-*Catnic* courts in the UK have artificially stretched the interpretation of *Catnic* to make it seem “EPC-friendly” or have accepted it

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115 * Ibid* at 484-485.
uncritically when it is in fact based on a different methodology. Unlike the EPC, which seeks to balance the rights of the patentee with those of the public through a middle-of-the-road approach which treats patent claims as neither “boundary-defining markers” nor merely guidelines, the Catnic / Improver approach, particularly its third step, appears to be informed, at least in cases where strict literal compliance is intended, by the “flagposts” approach to claim construction.

The Catnic test has also been criticised by Turner as being out of touch with legal realities by presupposing that a person skilled in the art is capable of interpreting the scope of a patent, when a legal background is required as well to comprehend the legal significance of the patent claim and its relationship to the patent specification. In effect, the notional skilled person will be able to interpret the claims purposively only after having understood their purpose as legal documents.

A cursory glance at the Catnic / Improver formulation would reveal its artificially complex approach to claim construction. The first step enquires whether the variant produces a material effect on how the invention works. If there is no material effect, then the decision maker is then invited to consider the second stage, which is whether the absence of a material effect would have been obvious to the skilled reader. The reason for the presence of the second stage is not quite clear, since the first stage has to be determined from the point of view of the highly skilled reader in any event – whether a variant produces a material effect is not a question that can be resolved independently by a decision maker or a bystander. The enquiry in the second stage can therefore be subsumed into the first stage since it is illogical to speak of a variant lacking a material effect without taking into account the individual whose point of view determines the answer to this first query. The third stage contains further infelicities of language and introduces additional complications to the framework by asking whether the patentee intended strict literal compliance with the terms of the patent

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116 Ibid.

117 Ibid at 533, where Turner writes: “Accordingly, patent claims should be interpreted on the basis that their purpose is neither to define the boundary of the monopoly, nor to act merely as guidelines for ascertaining the scope of the protection from the description and drawings, but rather to state the invention described and exemplified in the description and drawings, with a view to combining fair protection for the patentee with a reasonable degree of certainty for third parties.”

118 Ibid at 531.
claim. However, this enquiry is already inherent in the first stage, since whether a variant produces a material effect itself depends on how broadly the patent claim is drafted, as interpreted through the eyes of the highly skilled reader.

It has been observed, quite interestingly, by Hoffman J (as he then was) in Improver that it is essentially the third question that raises the determinative issue of construction, considering how the first two questions concern issues of fact, and can only be resolved satisfactorily by reference to the patent specification. Years later, in Kirin-Amgen, Lord Hoffmann acknowledged that the Protocol questions are “only guidelines, more useful in some cases than in others”.\(^\text{119}\) The more critical issue is applying the principle of purposive construction, which gives effect to the requirements of the Protocol, and which constitutes the “bedrock of patent construction, universally applicable”.\(^\text{120}\)

Based on the analysis above, it might be surmised that the key purpose of the Catnic / Improver test is to evaluate whether the “improvements” propounded by the variant are significant enough to escape infringement, purportedly from the point of view of the hypothetical skilled reader. From a practical perspective, any evaluation by a patent examiner or decision maker would not be feasible without taking into account the state of the art at the priority date, the nature of the technology involved, the contributions made by the patentee to that field of technology, and the language used in the patent claim, among a host of other relevant factors. What the patent judge is invited to do, therefore, is to evaluate, holistically, the contributions of accused device or process against those of the patented invention. It would be pretentious to assume that the hypothetical standard of the “skilled reader” provides a clear-cut, objective standard that inventors can rely on, since even experts in the field may disagree on the proper meaning to be given to disputed terms. Likewise, it would be unrealistic to expect a skilled reader to be able to divine in all cases, what the patentee “intended” from a reading of the patent claim.

What might be more appropriate for a system of purposive patent construction in Canada is a simplified approach that is driven by sound principles founded on the “middle course” approach that strives to draw a balance between the protection of innovation and the public interest. These

\(^\text{119}\) Kirin-Amgen 2005a, supra note 11 at para 52.
\(^\text{120}\) Ibid.
principles ought to be defined not by reference to an idealized individual, but by a range of factors that include the contribution that the patented invention makes to the state of the art, the nature of the field of technology concerned, and the magnitude of the “inventive step” requirement in the selected jurisdiction. As it stands, the Catnic / Improver test is needlessly complex and repetitive, and can simply be condensed into a single stage, based on the doctrine of purposive construction.

It is also important for courts to recognize that the doctrine of equivalents continues to play an important, albeit implicit, role in circumscribing the scope of the patent monopoly. It would be more intellectually honest to recognize that patent construction can involve a considerable amount of uncertainty, taking into account the inadequacies of natural language in describing technological applications, and not to pretend that peripheral claiming offers more certainty or stability. In this regard, Burk and Lemley suggest that “fence posts” are really an “illusion”, and that central “sign posts” provide more certainty to a patent system. A “middle course” approach to patent interpretation would accordingly be more effective in promoting innovation and fair competition than a model that places undue emphasis on claim language as the test for a patent’s scope of protection.

B. Developing a Contextual, Industry-Sensitive Approach to the Doctrine of Equivalents

The previous sections have surmised that a viable patent system cannot survive without some form of “allowance” for “non-literal infringement”, even though each patent system might have its particular features or characteristics. It has been argued that how this “allowance” is labelled – whether as a “doctrine of equivalents” or by reference to some other appellation – is immaterial. It has also been suggested that the Catnic/Improver questions are unnecessarily complex and should be

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121 See for instance Takenaka, supra note 34 at 504, who notes that limiting infringement to the “literal patent scope” would not remove uncertainty from the claim construction process. Judges will still have to consider whether a disputed element, or a disputed relationship between elements, is included within the patent claim. In this regard, disputes can arise over apparently simple words such as “on”. It would therefore be inaccurate to suggest that literal construction can serve as a panacea to the dimension of uncertainty in the patent interpretation process.

122 See Burk & Lemley, supra note 4 at 1799.
simplified to imbue claim construction methodology with a purposive approach that is consistent with the EPC. In this regard, more attention should be paid to the question of how “purposive interpretation” or “equivalents analysis” can be applied to promote the “balance” inherent in the EPC approach, with the ultimate goal of promoting innovation in Canada and facilitating its transition to a robust, knowledge-based economy.

This article seeks to formulate a non-exhaustive list of factors that ought to justify a more robust application of the doctrine of equivalents. In doing so, it seeks to answer the question: “how should one determine, in a given case, the breadth of protection offered by the doctrine of equivalents in line with a ‘purposive construction’ approach”? Further, in drawing upon the arguments in the preceding sections, this article seeks to refocus the debate on patent interpretation from whether a doctrine of equivalents is needed to how such a doctrine should be applied. Recognising the embedded nature of equivalents analysis in any claim construction process would help to provoke and inspire new lines of inquiry into the factors and criteria that should be employed by patent examiners in determining a fair and equitable scope of protection, in line with the “middle course” purposive construction approach.

One way of focusing the patent interpretation process on the “penumbra of protection” conferred on a patented invention is to distinguish between two categories of allegedly infringing substitutes, namely, (i) “trivial variants” and (ii) “mechanical equivalents”. These two categories, both of which relate to non-literal infringement, will be dealt with separately in the following paragraphs.

1. Trivial Variants

Trivial variants can be defined as substitutes which make insignificant modifications to a patented invention which do not affect its purpose, function or method of operation. Such insignificant modifications – “bells and whistles”, so to speak – should always be captured within the patent’s

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123 See Bainbridge, supra note 3 at 536. Bainbridge suggests that the doctrine of equivalents should be available for minor variants, even if the patent claim has been drafted in very narrow language. In the case of mechanical equivalents, he proposes that the scope of protection be determined by the terms of the patent claim. However, he is willing to acknowledge a role for the doctrine of equivalents for mechanical equivalents in cases where he postulates “strict literal compliance” as not being intended by the patentee.
“penumbra of protection”, even though the modifications would take the variant outside the strict literal meaning of the patent claim. For instance, tilting a lintel slightly, by six to eight degrees, as in the case of Catnic, would be a “trivial variation” if the change produced no independent technical advantage in the judgement of the skilled reader. In the case of trivial variants, the doctrine of equivalents would have an integral role to play in ensuring that the variants in question fall within the patent’s “scope of capture”, without which even small and technically insignificant changes to an invention would allow a competitor to evade infringement.

2. Mechanical Equivalents

A more critical question, however, is how equivalents analysis would apply in cases where the variants in question contain substituted elements which are not merely trivial, but which produce similar results or perform similar functions. Mechanical equivalents are substitutes which make a more than de minimis alteration to the patented technology either by substituting elements or by making improvements to the underlying technology. The main uncertainty in applying “equivalents analysis” to allegedly infringing variants would arise in relation to this category of “substitutes”. A “mechanical equivalent” may or may not fall within the penumbra of protection (scope of capture) for a patented invention. The determination of an equivalent’s infringing status should, of course, depend on a purposive interpretation of whether it replicates the patented invention’s “essential” elements. The challenge lies in determining how broadly the term “essential” should be construed to evaluate the legitimacy of the variant as a legally permissible substitute in the market.

Yet, what constitutes “essential” in a given invention is ultimately a question of context, which must be determined by factors such as the nature of the industry, and the invention’s overall contribution to the field of technology. The extent to which the doctrine of equivalents should be applied vigorously (as opposed to conservatively – if restricted only to cases of trivial variants) should be determined by the presence of a number of factors, which will be outlined in this section of the article. In formulating this list of factors, valuable insights can be drawn from the patent law literature of the United States. A combination of these proposals can be applied productively in Canada to assist in its adoption of a “middle-of-the-road” approach to purposive patent construction.
Suggestions made by U.S. patent scholars such as Christopher Cotropia and Benjamin Roin may be particularly insightful in describing how a doctrine of equivalents can be applied to a system of purposive patent construction. These commentators suggest that “equivalents analysis” is particularly helpful in specific industries to stimulate R&D efforts and protect the fruits of innovation. Although Cotropia and Roin both identify specific criteria that would make a field of technology particularly suitable for “equivalents analysis”, their recommendations emphasize different aspects of technological advancement – one based on whether innovation is cumulative, and the other on the time it takes to develop an invention.

In his article, Benjamin Roin notes that the patent system’s “one-size-fits-all” approach to innovation fails to adequately distinguish between industries or technologies. In particular, the effectiveness of patent law in stimulating innovation varies greatly across industries; it may promote inventive activity in one, while stifling research and development in another. This inability to tailor the optimal strength for each patent based on its field of industry is economically inefficient, claims Roin, as inventions are over-protected in some industries while under-protected in others. In response to this concern, Roin proposes that the strength of a patent award should be tailored according to an objective, observable criterion – the amount of time it takes from the first conception of the initial idea for the patented invention to its first sale as a commercialized product.  

One of the features of the patent award system that Roin contemplates “tailoring” in his proposal is the duration of the patent award. In Roin’s “differentiated patent system”, one of the ways in which patent strength can be “tailored” to fit the needs of industry is to adjust the period of protection. This would help to distinguish between inventions that take a short time to develop, and products that are developed over many years of time-consuming research and development.

Although “non-literal infringement” is not the main focus of Roin’s analysis, a possible variation of Roin’s idea would be to tailor the doctrine of equivalents to apply more prominently to areas of innovation that would benefit most from an enhanced incentive to invent. Such a model would

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125 Ibid at 685; 698-704 and 737-739. Roin suggests in his article, at 685, that: “Inventions that take longer to reach the market therefore will likely need stronger patent rights as an incentive for their R&D, whereas inventions with a shorter time-to-market usually
provide for a broader scope of “non-literal” protection against infringement to a product with a longer “time-to-market”. That would provide protection against “after-arising” equivalents that exploit the underlying patented technology whilst making modifications of an insignificant or non-material nature.

Whilst the theoretical application of Roin’s suggestion to adjust the strength of a patent (and possibly the availability of non-literal infringement) based on “time-to-market” might seem attractive at first glance, there are several issues that need to be considered. First, although “time-to-market” could be indicative of the patent’s contribution to the field of technology, the length of an invention’s “incubation” period is not necessarily reflective of its quality. As has been pointed out in the literature, a small and Liliputian step can sometimes be of highly inventive quality. In simple terms, a patented invention that is developed over a relatively short span of time through prudent and efficient use of R&D resources could be just as deserving of protection as one that takes twice as long to produce. Hence, “time-to-market”, while an observable criterion, does not always take into account the intensity or quality of the research and development activity that takes place during the product’s “incubation period”.

Second, the “time-to-market” criterion may not always reflect the myriad variety of products that may be generated within a single field of technology. The “time-to-market” patent model runs the risk of being subject to the criticism of being unduly “one-dimensional” in assuming that all products within that industry are likely to be developed at the same pace. An important factor that ought not to be overlooked is that some products might have a higher turnover rate than others, even within the same industry or field of technology, and both the turnover rate and the time-to-market for a specific industry may change as the technology evolves and matures. It is therefore unsafe to assume a universal standard of “time-to-market” for a single industry or even product line. A highly inventive product with a lengthy time-to-market may be followed by both cumulative as well as non-cumulative after-arising improvements within the same

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126 See for instance, First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd [2008] 1 SLR (R) 335 at para 54 in which the court held that a “seemingly Liliputian step” could be a significant step forward that nobody else had taken before. See also Stanley Lai, “The Future of Inventive Step in Patent Law” (2012) 24 SAcLJ 599 at 616.
industry that build upon the patented technology at different rates and speeds of development.

Christopher Cotropia opts to approach the issue from a somewhat different angle, choosing to focus on the cumulative nature of technological development in an industry, rather than on a product’s “time-to-market”. In an article that predates Roin’s, Cotropia posits that the doctrine of equivalents should be tailored to cumulative rapidly developing industries.\(^{127}\) It is in such industries that the need for protection against “after-arising equivalents” is most urgent, since a close, “non-literal” substitute that is released by a competitor on the market could kill demand for the patented invention, dramatically cutting short the effective life-span of the patent.\(^{128}\) Providing protection against after-arising equivalents through the doctrine of equivalents might seem, at first glance, to discourage innovation in the specific industry, but Cotropia notes that such protection would actually promote the development of socially valuable, patent-calibre inventions by assuring successful patentees of an effective patent life span, rather than incentivising trivial improvements to the patented subject matter.\(^{129}\) Cotropia notes that the need for “equivalents protection” is not strongly felt in non-cumulative industries, because after-arising technologies do not generally build upon the patented technology.\(^{130}\)

In developing his model, Cotropia recognises that the rate of innovation in an industry is not static and may “wax and wane” with time. In order to tailor “patent scope” interpretation to provide optimal incentives for innovation, Cotropia suggests that a dynamic system for the doctrine of equivalents, whereby “equivalents protection” is “activated” when innovation in an industry is cumulative and rapidly developing, and then “turned off” when the rate of cumulative development slows down.\(^{131}\) This dynamic system of activation and de-activation would seek to peg the scope of protection to the level of incentives necessary to optimize the benefits of R&D activity within the industry.\(^{132}\) Cotropia’s approach is therefore a qualified endorsement of the doctrine of equivalents – with equivalents

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\(^{127}\) Christopher A Cotropia, supra note 6 at 152 and 192-201.

\(^{128}\) Ibid at 174 and 189.

\(^{129}\) Ibid at 194 and 200.

\(^{130}\) Ibid at 190.

\(^{131}\) Ibid at 197-198.

\(^{132}\) Ibid at 198 and 200-201.
protection playing a more prevalent role in certain types of industry where the need for protection against after-arising technologies is most strongly felt for the purpose of stimulating the production of patent-calibre inventions. This argument is consistent with the view propounded by Burk and Lemley that central claiming has survived for a considerable period of time and its relevance is most palpably felt during an epoch of robust innovation and technological development.\textsuperscript{133}

Despite the appeal of Cotropia’s model, there may be practical difficulties in treating the rate of cumulative development of an industry as an isolated factor in applying the doctrine of equivalents. The first relates to the challenge of measuring with precision the transition of an industry from “cumulative” to “non-cumulative”. Should this enquiry be determined by the number of “improvements” made to a patented invention in the first three years of its patent life cycle, or should the quality of those improvements be taken into account? How large should the decline in the number of improvements be in order for an industry to cease to be “cumulative”? If the answers to these questions are context-specific, then determining how “cumulative” an industry is may not be as simple as activating an “on-off” switch. An industry whose rate of cumulative progression is gradual, sporadic or even fluctuating may create empirical difficulties if discrete, measurable results for the purpose of determining the penumbra of protection are not readily available.

A second question relates to whether judges are in the most suitable position to “activate” or “deactivate” the doctrine of equivalents for a specific industry based on its rate of cumulative improvement. Unless there is some objective method of determining exactly when an industry becomes “non-cumulative”, if indeed such a state is measurable in discrete terms rather than a question of degree, placing the duty of “activation” on the shoulders of judges would place a tremendous burden on them\textsuperscript{134} and is likely to escalate the costs and time of patent litigation. Although Cotropia

\textsuperscript{133} See Burk & Lemley, supra note 4 at 1771. See also Waelde, et al., supra note 1 at 475 at para 11.200, where they describe the limitations of the Catnic / Improver test for “fast moving technologies”. This might be construed as an implicit acknowledgement that the doctrine of equivalents could have a more viable role to play in the case of some fields of technology as compared to others.

\textsuperscript{134} See S Jay Plager, “Challenges for Intellectual Property Law in the Twenty-First Century: Indeterminacy and Other Problems” (2001) U Ill L Rev 69 at 80, who observes that judges are, on the whole, ill-equipped to handle the task of patent claim construction.
suggests placing the burden of proof on the patentee to show rapid and cumulative development, the (often considerable) time lag between the alleged infringement and the date of the judgment is an important practical consideration in patent litigation. One issue that might arise is whether the (often slow moving) judicial process is sufficiently attuned to the pulse of technological change to provide a sufficiently responsive mechanism with which to optimize innovative activity.

This article suggests that a more feasible approach to “equivalents analysis” would be to consider a combination of factors that would include the elements identified by Roin and Cotropia instead of treating them as “standalone” regimes of patent construction. A multifactorial test for equivalents analysis would provide patent examiners and courts with the flexibility to apply the doctrine of “non-literal infringement” to mechanical equivalents without being constrained by the artificial strictures of a monolithic test that may not work well with all fields of technology. A contextual approach would have the added benefit of recognizing the futility of a “one-size-fits-all” standard of evaluation for equivalents across all fields of industry, and being more compatible with the “middle of the road” approach that this article is proposing for the Canadian patent system.

In light of the concerns discussed in the earlier paragraphs, a doctrine of purposive interpretation for determining a patent’s “penumbra of protection” should not be evaluated solely on the basis of “time-to-market” or the cumulative rate of technological change. Rather, these two factors should be viewed holistically alongside other considerations such as the quality of the equivalent’s contribution to the technology, its social utility, and the degree of inventiveness inherent in the allegedly infringing variant. A lengthy time-to-market, a cumulative field of technology, and the pioneering nature of a breakthrough invention are non-exhaustive factors which, if present in a given case, could favour a more robust application of the doctrine of equivalents.

Given the constantly evolving nature of technology and the disparate range of industries represented by inventions that are potentially protectable by patent law, a contextual, multi-factorial test for purposive construction would allow the scope of patent protection to be determined in a more nuanced and technology-sensitive manner, whilst recognising the importance of fostering a balance between the protection of investments in

135 Cotropia, supra note 6 at 200-201.
R&D and the preservation of fair competition in a knowledge-based economy.

V. CONCLUSION

Although the doctrine of equivalents continues to attract controversy in patent law, it nevertheless plays a vital role in striking an equitable balance between protecting innovation and promoting fair competition in the modern marketplace. This article has sought to demonstrate, through a comparative analysis of patent trends in the United States, the United Kingdom and Canada, that the doctrine of equivalents is in fact embedded in the processes of patent claim construction. Despite an outward trend to embrace the “peripheral claiming” methodology, “equivalents analysis” remains an integral part of claim interpretation, whether it is referred to as a doctrine of equivalents, a doctrine of non-literal infringement, a doctrine of purposive construction or a doctrine of central claiming.

In addition, this article has sought to refocus the debate over claim construction by arguing that more explicit recognition should be paid to the role that “equivalents analysis” plays in demarcating the scope of patent protection. As part of its goal of shifting the debate away from whether a doctrine of equivalents is needed to how it should be applied in Canada, this article suggests that the two undercurrents in Canadian patent law – the “pith and marrow” approach and purposive interpretation – can in fact be applied harmoniously. Although these two approaches have been characterized in the UK jurisprudence as being in conflict, they are not incompatible and should be integrated into a system of central claiming in Canada based on the “middle course approach” to patent construction. In constructing a balanced patent regime, Canada should explicitly recognize the utility of “equivalence analysis”, and place greater emphasis on identifying the “penumbra of protection” granted to an invention by patent law.

Finally, the article concludes with some thoughts on how to implement the doctrine of equivalents more flexibly in Canada. Although Catnic and the UK case law have been applied and endorsed by Canadian courts, recognizing the limitations of the Catnic / Improver algorithm as a test for infringement would be an important first step in recalibrating Canadian patent claim construction methodology to accommodate “equivalents analysis” as an indispensable component of purposive interpretation.
Further, by drawing insights from the patent literature in the United States, it posits that an industry-sensitive approach would be preferable to a “blanket” approach in applying the doctrine of equivalents to foster innovation and technological growth. However, given the diversity of factors that might affect the need for protection against “equivalents”, such as whether the technology is driven by cumulative improvements, the time it takes to develop a patented technology, and the qualitative impact the invention has, it is necessary to adopt a contextual approach to determine the size of a patent’s penumbra of protection against equivalents and after-arising variants.

It is indeed with great caution that the “Pandora’s Box” of patent claim construction should be opened by patent examiners and judges deciding patent cases. In this regard, adopting an industry-sensitive approach to the doctrine of equivalents would imbue patent law with a greater degree of flexibility with which to balance innovation with the public interest, and to facilitate Canada’s transition into a more vibrant and innovative knowledge-based economy.