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Res or Rules - Patents and the (Uncertain) Rules of the Game

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RES OR RULES? PATENTS AND THE (UNCERTAIN) RULES OF THE GAME

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INTRODUCTION

The stakes at play in modern-day patent infringement suits can be worth hundreds of millions of dollars. Just ask the executives of Research In Motion, Ltd. ("RIM"). In "one of the most celebrated intellectual property showdowns in U.S. history,"[1] NTP, Inc. sued RIM, the Canadian corporation that developed the popular BlackBerry system, for patent infringement.[2]

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1. Barrie McKenna, Paul Waldie & Simon Avery, *Patently Absurd*, THE GLOBE & MAIL (Apr. 5, 2009), http://www.theglobeandmail.com/archives/article814090.ece.

2. NTP, Inc. v. Research In Motion, Ltd., 261 F. Supp. 2d 423 (D. Va. 2002). "Patent trolls" have often been defined as those who own but do not use patents other than as a means to extract rents in the form of royalties or litigation damages from potential infringers. *See, e.g.*, Larry A. DiMatteo, *Strategic Contracting: Contract Law as a Source of Competitive Advantage*, 47 AM. BUS. L.J. 727, 751 (2010); Adam Mossoff, *The Rise and Fall of the First American Patent Thicket: The Sewing Machine War of the 1850s*, 53 ARIZ. L. REV. 165, 194 (2011). Although the inventor behind NTP's patents apparently did try at first to market his wireless email technology, NTP later was formed as a non-practicing entity. McKenna et al.,

NTP, an alleged "patent troll," maintained that several of its wireless email communication patents covered various configurations of RIM's BlackBerry technology and that RIM was therefore violating NTP's rights by producing and selling the BlackBerry without NTP's permission. After spending over five years in court and settlement negotiations, RIM ultimately paid NTP $612.5 million to settle the case.[3]

How could RIM have made such an expensive mistake? After all, NTP's patents were all of public record. Shouldn't RIM simply have done its homework and realized that its BlackBerry system was running afoul of NTP's intellectual property rights? As is typically true of patent infringement cases, there were many reasons RIM ended up paying such a large price for infringing NTP's patents. But many critics complain that a lack of clarity as to patent scope turns almost all major patent infringement cases into costly messes.

In particular, critics of the patent system argue that patents do a poor job of specifying what does and does not constitute infringement of their claims' scope. And in RIM and NTP's case, the parties did in fact spend a good deal of their time before both the trial and appellate courts wrangling over the exact scope of NTP's patent rights and, specifically, whether NTP's patents actually covered RIM's BlackBerry system. The proper interpretation of the patents' claims consumed several pages of the Federal Circuit's decision, including extended discussions on the meaning of the terms "electronic mail system," "originating processor," and "gateway switch."[4] Such extended debates over patent claim interpretation are hardly unique. Patent infringement cases have famously hinged on the meanings of even simpler words, such as "a," "or," "to," "on," "about," "including," and "through."[5]

Despite the fact that most people familiar with the patent system view patents as an area of law dealing with science and technology, not linguistics, distinctions about the meaning of words are routine in patent litigation.[6] Patents are written documents, and the words used in a patent's claims define the legally binding effect of the patent owner's rights. Accordingly, patent claim construction—how we interpret the meaning of that part of the patent that defines its scope—takes center stage in nearly every suit alleging infringement of a patent, causing uncertainty as to the outcome of the case.[7]

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supra note 1; Stephanie Stoughton, *How Patent Suit Became Judge's Nightmare*, TMCNET (Nov. 20, 2005), http://news.tmcnet.com/news/2005/nov/1209795.htm.

3. NTP, Inc. v. Research In Motion, Ltd., 418 F.3d 1282, 1292 (Fed. Cir. 2005); Tom Krazit & Anne Broache, *BlackBerry Saved*, CNET NEWS (Mar. 3, 2006), http://news.cnet.com/BlackBerry-saved/2100-1047_3-6045880.html; Stoughton, *supra* note 2.

4. *NTP, Inc.*, 418 F.3d at 1294–1311.

5. Dan L. Burk & Mark A. Lemley, *Quantum Patent Mechanics*, 9 LEWIS & CLARK L. REV. 29, 53 (2005).

6. *Id.*

7. Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Post? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743, 1744 (2009); Mark A. Lemley, *The Changing Meaning of Patent Claim Terms*, 104 MICH. L. REV. 105, 106 (2005); S. Jay Plager, *Chal-*

Neither patentees nor alleged infringers know the exact scope of a patent until a court interprets that patent's claims as a matter of law.[8]

To those who have studied the law, this type of ambiguity is commonplace. From criminal statutes and tax regulations to clauses in contracts and wills, legal documents cannot always anticipate every situation to which the rules in that document might apply. Most of the time what does or does not fit within the meaning of a statute or a contract will be fairly clear. But those instances in which it is not so clear are the most likely to wind up in court. Courts must therefore interpret the unclear statute, regulation, contract, or will after the fact to determine how it should apply. Even bright-line rules and airtight contracts are porous at their edges.[9] As a result, the outcome of certain cases may depend on fine distinctions about the meaning of words and even punctuation.

For many critics, such linguistic ambiguity in the scope of patent rights is troubling and yet particularly common in areas such as biotechnology, computer software, and business method patents.[10] These critics complain that both patent holders and potential infringers too often risk millions of dollars over patent claim language that must be interpreted by a court.[11] The purpose of patent claims, the critics argue, is to demarcate clearly the boundaries of the patent holder's rights. Each demarcation also gives notice to others of where the patent holder's rights end. In other words, patent claims are supposed to draw linguistic lines around the patented invention.

The critics therefore liken patent claims not to statutes, contracts, or other legal writings, but to property boundary lines and, in particular, "tangible" property lines, by which they seem mostly to mean real property boundaries.[12] Under this analogy, they argue, patent claim language should

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lenges for Intellectual Property Law in the Twenty-First Century: Indeterminacy and Other Problems, 2001 U. ILL. L. REV. 69, 71.

8. Burk & Lemley, *supra* note 7, at 1762.

9. Gillian K. Hadfield, *Weighing the Value of Vagueness: An Economic Perspective on Precision in the Law*, 82 CALIF. L. REV. 541, 543 (1994); Jason Scott Johnston, *Uncertainty, Chaos, and the Torts Process: An Economic Analysis of Legal Form*, 76 CORNELL L. REV. 341, 345–46 (1991).

10. *E.g.*, JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 172–73 (2008); Burk & Lemley, *supra* note 7, at 1760.

11. *See, e.g.*, BESSEN & MEURER, *supra* note 10, *passim*.

12. *See* BESSEN & MEURER, *supra* note 10, at 8–11; John F. Duffy, *Intellectual Property Isolationism and the Average Cost Thesis*, 83 TEX. L. REV. 1077, 1085 (2005); Paul J. Heald, *A Transaction Costs Theory of Patent Law*, 66 OHIO ST. L.J. 473, 487–88 (2006); F. Scott Kieff, *Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L.J. 327, 426 (2006); Chris R. McManis, *Re-Engineering Patent Law: The Challenge of New Technologies*, 2 WASH. U. J.L. & POL'Y 109, 109 (2000); Christopher M. Newman, *Patent Infringement as Nuisance*, 59 CATH. U. L. REV. 61, 65–69, 109 (2009); Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1793–94 (2007).

be as unambiguous as real property boundaries are.[13] As RIM and NTP's case and thousands of other examples illustrate, patent claims fall far short of this ideal. Some critics even argue that patent claim boundaries are so uncertain that they threaten to undermine the very purpose of the patent system to incentivize investment in technological progress.[14] The Federal Circuit itself has repeatedly expressed concern over the uncertainty of patent claims.[15]

For the most part, the analogy between patents and property is understandable. Patents are often viewed as property because they share many of property's hallmarks, including the all-important right to exclude.[16] But to jump from these similarities to the conclusion that patent claims should be as clear as tangible property boundaries is a misleading generalization.

As any first-year law student can explain, "property" is just a legal conclusion, a variable bundle of rights asserted over a "thing" or a resource but separate from the particular thing or resource itself, the latter of which is merely the *res* of those property rights.[17] Although it is not entirely clear, most critics of patent claim clarity seem to be comparing patent claims not to the legal interests in a property *res* but to the boundaries of the particular tangible things or resources that the *res* comprises. In particular, the critics most often seem to compare patent claims to fences or the metes and bounds of real property, rather than to easements, leaseholds, or other legal interests in property.

Of course, an important question is why critics should compare patent claims with only "tangible" property boundaries. Property rights can be asserted over a wide variety of things and resources, many of which are neither "tangible" nor physical. For example, property interests in corporations and partnerships, in financial obligations, and even in property interests themselves are common forms of "intangible" property.[18] Why critics do not

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13. *E.g.*, BESSEN & MEURER, *supra* note 10, *passim*; ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT 171 (2004); Plager, *supra* note 7, at 72; David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 259 (2008); *see also* Burk & Lemley, *supra* note 7, at 1744.

14. BESSEN & MEURER, *supra* note 10, *passim*; JAFFE & LERNER, *supra* note 13, *passim*; John M. Golden, *Construing Patent Claims According to Their "Interpretive Community:" A Call for an Attorney-Plus-Artisan Perspective*, 21 HARV. J.L. & TECH. 321, 323 (2008); Kimberly A. Moore, *Are District Court Judges Equipped to Resolve Patent Cases?*, 15 HARV. J.L. & TECH. 1, 28 (2001); Craig Allen Nard, *Certainty, Fence Building, and the Useful Arts*, 74 IND. L.J. 759, 759–60 (1999).

15. Markman v. Westview Instrs., Inc., 52 F.3d 967, 978–79 (Fed. Cir. 1995).

16. Michael A. Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1, 52–58 (2004).

17. Juliet M. Moringiello, *What Virtual Worlds Can Do for Property Law*, 62 FLA. L. REV. 159, 178–79 (2010); Henry E. Smith, *Property and Property Rules*, 79 N.Y.U. L. REV. 1719, 1728 (2004).

18. Smith, *supra* note 12, at 1744.

compare patent claim clarity to clarity in defining these other, non-tangible types of property *res* is somewhat puzzling. Even the critics themselves are quick to concede that part of the problem of comparing patent claims with real property boundaries is that the inventive concepts protected under patents are obviously intangible and therefore more difficult to delineate.

Faulting the patent system simply because patent claims are necessarily more ambiguous than real property or other "tangible" boundaries thus begs the question: are these two types of "property" truly comparable? The comparison between real property boundaries and patent boundaries necessarily assumes that real property boundaries are clear and that patent boundaries therefore should—and can—be as clear as those in real property. Even accepting the debatable idea that real property boundaries are clear,[19] one cannot simply assume that the demarcation of real property boundaries is the proper framework for evaluating uncertainty in patent claims.

Rather, the initial question should be: are patents so similar to plats for land that their respective boundaries should be defined with the same clarity? Or do these two versions of "property" inevitably differ in ways that affect the clarity with which we can expect to define them? Many scholars have already questioned the value of the patent-as-property analogy in a variety of other contexts.[20] This Article concludes that, given the intrinsic differences between patents and property, patent claims are always more uncertain than the boundaries of tangible property. This is by no means a revolutionary statement to the extent it suggests that a fair degree of uncertainty in patent claims is inevitable.[21] What this Article adds to the discussion, however, is the idea that our current patent claiming system is not necessarily "broken" simply because it yields less certainty than real property systems.

Indeed, any comparison between the two types of regimes is misleading, for the assets protected and the purposes of the two regimes are completely different. First, one oft-noted difference is that the assets protected under the patent system, unlike those protected under real property, are not only intangible but also highly conceptual, abstract, and functional in a way that defies clear definition. This is a problem that seems to be most commonly cited with regard to biotechnology, computer software, and business

19. *See* John Mixon & Gordon Otto, *Continuous Quality Improvement, Law, and Legal Education*, 43 EMORY L.J. 393, 423 (1994) (citing Myres S. McDougal & John W. Brabner-Smith, *Land Title Transfer: A Regression*, 48 YALE L.J. 1125 *passim* (1939)) (characterizing the U.S. land title system as "inefficient").

20. Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031 *passim* (2005) (criticizing comparisons between social and private costs of patents versus real property); *cf.* Adam Mossoff, *Property Metaphors and Myths in Patent Law* (2010) (unpublished manuscript) (on file with author) (arguing that comparing infringement to trespass on property is misleading); Newman, *supra* note 12, at 104–19.

21. Burk & Lemley, *supra* note 7, at 1744; Schwartz, *supra* note 13, at 259.

method patents.[22] As explained below, however, abstract patent claiming is certainly not unique to any one area of technology but rather applies to all patentable inventions, albeit to varying degrees.[23]

Second, because the *res* of patent "property" rights are always novel and unique, claim drafters must find equally novel ways to describe their inventions and cannot simply rely on previously established points of reference.[24] Third, propertization of a patent asset is almost immediately defeasible, by design, reflecting the differing purposes of the patent system and real property systems. The patent system is designed to incentivize the creation and expeditious release of new technological ideas as non-consumable goods, not to manage an existing plot of land as a rivalrous good.[25] Finally, the unpredictability of the future value and uses of a patent, and even the terminology by which it is defined, make patent claims highly uncertain compared to real property plats.

Uncertainty in patents stems from such different sources that it simply cannot be compared to uncertainty in real property boundaries.[26] Given that reducing uncertainty is costly, the optimal level of certainty in patent boundaries is unlikely to be the same as the optimal level of certainty in tangible property boundaries.

An alternative analogy gaining currency among some scholars is therefore to view modern patent claims not as a land surveyor might but as lawyers might. Instead of comparing patent claims to real property plats, it is more apt to compare patent claims to statutes, contracts, regulations, and other complex legal documents that may be clear for many purposes but inevitably require some interpretation at their margins.[27]

This shift in analogy is similar to what some refer to as the shift from "rules of exclusion" to "rules of governance."[28] Rules of exclusion embody the classical notion of property by pinpointing the asset from which one wishes to exclude all others. Rules of governance, on the other hand, are more familiar in the context of contracts, statutes, and regulations, for they fixate not so much on a particular asset but rather on the permitted and prohibited uses of an asset or on conduct untied to any particular asset.[29]

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22. *E.g.*, BESSEN & MEURER, *supra* note 10, at 172–73; Burk & Lemley, *supra* note 7, at 1760.

23. *See infra* text accompanying notes 98–101.

24. *See* Burk & Lemley, *supra* note 7, at 1749; Jeanne C. Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719, 726 (2009). *See generally* Clarissa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 465, 468 (2004) (noting that when property *res* is unusual and "non-paradigmatic," it lacks well-known referents and therefore is more difficult to describe).

25. Smith, *supra* note 12, at 1744.

26. *But see* Duffy, *supra* note 12, at 1090–91 (criticizing intellectual property exceptionalism and efforts to distinguish intellectual property from other types of property).

27. *See, e.g.*, Burk & Lemley, *supra* note 7, at 1761–62; Golden, *supra* note 14, at 323.

28. Fromer, *supra* note 24, at 725, 730; Smith, *supra* note 17, *passim*.

29. Fromer, *supra* note 24, at 725.

Patent claims give notice of not just what patent holders regard as their exclusive assets but also how all others may use their own assets without infringing the patentee's rights. Patent claims can thus be seen not only as the boundaries of a property *res* but also as rules of governance for the use of others' property. Historically speaking, patent claims have intentionally been patterned after rules, albeit not so much as a rejection of the property paradigm of patent rights but rather as a means to achieve more certainty in patent boundaries.

Even the most carefully drafted statute, contract, or other rule of governance, however, is limited in its ability to anticipate all situations.[30] Depending on the unpredictability of circumstances to which the rule might be applied, the rule may have to be drafted with more or less specificity and therefore more or less need for interpretation. The requisite novelty of patentable concepts as well as the unpredictability of future developments in the field lead not only to highly complex rules of governance but also to rules that are necessarily more flexible and therefore more vague. Patent claims thus fall at the more unpredictable end of the spectrum.

Indeed, given the design and purpose of the patent system, patent claims are inevitably uncertain because they must be adapted, often through *post hoc* interpretation, to the situation at hand. In this way, patents can be seen as lying along a spectrum between rules and standards, with rules specifying the law in detail *ex ante* and standards setting only the rough contours of the law, leaving further elaboration to be developed later during application. Much of not only modern patent claiming but also patent law more generally can be seen through this lens.[31]

The Article proceeds as follows. Part I reviews the basics of patent claiming, the traditional view of claims as real property deeds, and why uncertainty as to the boundaries of those deeds is considered undesirable. Part II critiques the analogy between real property deeds and patent claims, highlighting in particular the requisite novelty and conceptual nature of the patent *res*, the differences between the purposes of the patent system and real property regimes, and the effect of these different purposes on the expected predictability of patent boundaries. Part III then changes the analogy from patent claims as property deeds to patent claims as rules of governance, noting the advantages and limitations of this analogy. The Article concludes with a discussion of patent claims not just as rules of governance

30. *See* Golden, *supra* note 14, at 324 n.14 ("Given that patent rights exist at the evolving edges of technology and, like contracts, effectively 'regulate the future,' it is debatable whether demands for certainty in patent scope can ever be satisfied.") (citing Richard A. Posner, *The Law and Economics of Contract Interpretation*, 83 TEX. L. REV. 1581, 1582 (2005)).

31. Although suggested above as a possibility, whether patent claims can more profitably be compared to intangible property boundaries as rules of exclusion, rules of governance, or even some *tertium quid* is not considered here.

but also as blends of rules and standards in their need to anticipate often unpredictable circumstances.

I. THE CONVENTIONAL VIEW: PATENT CLAIMS AS PROPERTY DEEDS

Patents rights are in many ways property-like entitlements and are intended to serve at least two of the same major purposes as property rights. First, patents are designed to incentivize investments in developing new technologies by granting patentees the property-like right to exclude all others from their technologies, albeit for a limited period of time. In fact, the Patent Act explicitly states that "patents shall have the attributes of personal property."[32] Second, patents are designed to demarcate patentees' property rights by establishing the boundaries of those rights.[33] The claims of a patent are akin to the metes and bounds of real property and serve to give the public notice of the property *res*'s boundaries and what would constitute trespass.[34] Certainty in patent boundaries is desirable because it would provide patent holders some reassurances in investing in their rights of exclusion and allow for easy resolution of any conflicts over those rights, leading to greater efficiency overall.[35] The patent system, however, is often criticized for providing too little certainty as to patent boundaries.[36]

In the case of a patent, the right to exclude covers the right to prevent others from "making, using, offering for sale, or selling the [patented] invention throughout the United States or importing the invention into the United States."[37] These rights last for a period of only twenty years from the time the patent application is filed.[38] The purpose of this system comes from the Constitution itself, which grants Congress the power to "promote the Progress of . . . the useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their respective . . . Discoveries."[39]

Scientific research and discovery can involve a sizeable investment of resources. For example, economists estimate that bringing a single pharma-

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32. 35 U.S.C. § 261 (2011).

33. Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 254 (1994); Heald, *supra* note 12, at 475; Nard, *supra* note 14, at 759.

34. *E.g.*, Burk & Lemley, *supra* note 7, at 1744; Dam, *supra* note 33, at 254; Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 845 (1990); Nard, *supra* note 14, at 759.

35. *See, e.g.*, BESSEN & MEURER, *supra* note 10, at 30–45; JAFFE & LERNER, *supra* note 13, at 171; Gerald Sobel, *Patent Scope and Competition: Is the Federal Circuit's Approach Correct?*, 7 VA. J.L. & TECH. 3, 5 (2002).

36. JAFFE & LERNER, *supra* note 13, at 171.

37. 35 U.S.C. § 154(a)(1) (1997).

38. *Id.*; *id.* § 271(a). Prior to 1995, the patent term was seventeen years from the date of issuance. *Id.* § 154(a), 271(a) (1988) (amended 1994).

39. U.S. CONST. art. I, § 8, cl. 8.

ceutical product to the market currently costs upwards of $800 million.[40] No rational market actor would invest this kind of money without some significant chance to earn returns on that investment. By enjoying exclusive power to exploit their inventions for at least a limited period of time, inventors can protect their investments from free riding or outright theft by others.

Because inventive ideas and other intellectual goods are intangible, however, they are difficult to protect by physical or other non-legal means of exclusion. Unlike the owner of real property or other tangible goods, an inventor cannot simply build a fence around her inventive concept or lock it away in a safe.[41] Absent legal protections, her inventive idea can be freely exploited by anyone who can replicate it, with no risk of exhaustion.[42] The non-excludable and non-possessory (or "non-rivalrous") nature of intellectual goods often leads commentators to analogize them to the economic concept of "public goods."[43] Patents, copyrights, and other forms of intellectual property in theory at least solve the public goods problem by providing exclusivity through legal rights.[44]

The exclusivity of patents allows patent holders to price at supra-competitive levels in markets where their inventions have few or no close substitutes, thereby placing patentees in a better position to recoup their investments and even to earn significant profits. In this way, the patent system allocates to patentees a share of the overall social welfare their inventions create. Patent law is based on the theory that without the possibility of such returns, the market would lack adequate incentives to invest in technological progress.[45] In addition, patent rights are fully alienable, in whole or in part, as a way to encourage transfer to a higher-valuing user. The rights are thus private and market-based in a way that not only increases their liquidity but also allows the market to assess their value.[46]

Importantly, another purpose of patents is to provide public notice of the scope of the technological development over which the patentee claims exclusive rights.[47] Like property rights, patent rights are *in rem* and therefore

40. Henry Grabowski, *Are the Economics of Pharmaceutical Research and Development Changing?*, 22 PHARMACOECONOMICS 15, 16 (2004).

41. WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 14, 19–20, 23–24 (2003).

42. *Id.*

43. *Id.*

44. *Id.*

45. *See generally* BESSEN & MEURER, *supra* note 10 (discussing patent law's apparent success in this regard); Lemley, *supra* note 20 (analyzing whether capture of full social value is necessary for this incentive effect).

46. Carrier, *supra* note 16, at 58–62. Until recently, injunctive relief was also a common remedy for patent infringement, but it may be somewhat less common after the Supreme Court's decision in *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388 (2006).

47. Christopher A. Cotropia, *Patent Claim Interpretation Methodologies and Their Claim Scope Paradigms*, 47 WM. & MARY L. REV. 49, 54 (2005); F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules*, 45 B.C. L. REV. 55, 69 (2003).

good against all comers, regardless of relationship or agreement. Also like property rights, liability for infringing patent rights is strict and applies regardless of intent or even awareness of the patent.[48] The rights granted under patents are publicly recorded to provide notice and give potential infringers at least the opportunity to discover how they might run afoul of another's rights.[49]

Merely drawing a picture of one's invention or describing examples of it does not necessarily give others adequate notice of what might constitute infringement of a particular patent, however. Without a doubt, examples of the invention and explanations of its technological background are often necessary to understand the invention. Patentees will routinely include such materials in what is called the "specification" of a patent.[50] These kinds of materials nonetheless do not inform the public of what specifically belongs to the patentee under the patent.

Rather, under a patents-as-property analogy, the actual metes and bounds of the *res* of that particular patentee's property right over her invention are set forth in the "claims" of the patent.[51] The claims are detailed descriptions of the property *res*, found at the end of a patent and "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."[52] A single patent may contain multiple claims of varying breadth, each describing variations on the underlying invention.

The claims of a patent thus inform others of the "property" the patent covers and, just as importantly, what it does not cover. To use technology that is claimed within a patent, subsequent inventors must license the patent, invest resources in "designing around" it to produce a non-infringing alternative, or forgo competing with the patented invention altogether.[53] Technology not claimed within a patent, on the other hand, can be used freely by anyone, including subsequent inventors who may invent or discover their own advances.[54] The patent system thereby guards against the assertion of exclusive rights over technology that patentees did not in fact

48. *Cf.* Moringiello, *supra* note 17, at 180 (describing property rights by the extent to which they bind persons other than parties to the instrument conveying the right); Smith, *supra* note 12, at 1744–45, 1784–85, 1793, 1796–97, 1800.

49. BESSEN & MEURER, *supra* note 10, at 31.

50. 35 U.S.C. § 111 (1997).

51. *E.g.*, Burk & Lemley, *supra* note 7, at 1744 ("[W]ords of a claim form a sort of conceptual 'fence' that marks the edge of the patentee's rights."); Dam, *supra* note 33, at 254; Merges & Nelson, *supra* note 34, at 845; Nard, *supra* note 14, at 759, 785–86.

52. 35 U.S.C. § 112 (2010).

53. John H. Barton, *Patents and Antitrust: A Rethinking in Light of Patent Breadth and Sequential Innovation*, 65 ANTITRUST L.J. 449 (1997); Jay P. Kesan & Marc Banik, *Patents as Incomplete Contracts: Aligning Incentives for R&D Investment with Incentives to Disclose Prior Art*, 2 WASH. U. J.L. & POL'Y 23, 25 (2000); Nard, *supra* note 14, at 759.

54. Cotropia, *supra* note 47, at 54.

invent or that otherwise does not meet the law's stringent patentability requirements.[55]

Patent claims and how they are interpreted, therefore, take on singular importance. Patent claim interpretations are usually dispositive of both whether an alleged infringer has infringed the patent and whether the patent holder is asserting valid patent coverage. In this way patent claim construction is also dispositive of a patent's strength, or scope, which in turn determines the patent's possible economic value.[56] As famously said by Judge Giles Rich, one of the founding fathers of modern patent law, "the name of the game is the claim."[57] When a patent's claims are uncertain, its legal effect is uncertain as well.

When we speak of "uncertainty" in the law generally, we usually mean *ex ante* ambiguity as to how the law will apply to any given fact pattern. Uncertainty may arise from a lack of clarity in how the law is defined, such as when the law is vaguely worded or incomplete in its content. Similarly, uncertainty may arise due to ambiguities about the facts to which a law must be applied. Finally, uncertainty may arise from doubts about how to interpret a law or how to apply a law to a given set of facts.[58] Regardless of its cause, uncertainty in the law ultimately means uncertainty about the law's consequences.[59] Both potential plaintiffs and defendants and even the courts may be unable to predict *ex ante* what outcome the law will dictate.[60]

Given that a patent's claims define the value of the patent, uncertainty as to the scope of those claims also makes the value of the patent uncertain. That uncertainty may in turn discourage inventors and their investors from making optimal investments in research and development or in the marketing and other commercialization necessary to bring an invention to the public.[61] Predictability as to the meaning of a patent's claims, on the other hand, assures that no nasty surprises will crop up if and when the claims are applied *ex post*.

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55. *See* Christopher A. Cotropia, *Patent Claim Interpretation and Information Costs*, 9 LEWIS & CLARK L. REV. 57, 69 (2005). For more detail on patentability requirements, see *infra* text accompanying note 144.

56. Burk & Lemley, *supra* note 7, at 1795; Lemley, *supra* note 7, at 102 ("[O]nce the court construes the claims, most patent cases settle, and those that do not are often decided on summary judgment.") (footnote omitted).

57. Hilton Davis Chem. Co. v. Warner Jenkinson Co., 62 F.3d 1512, 1539 (Fed. Cir. 1995) (quoting Giles Rich, *The Extent of the Protection and Interpretation of Claims—American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497, 499, 501 (1990)).

58. Hadfield, *supra* note 9, at 542. Uncertainty as to legal outcomes can also arise from probabilistic detection or enforcement, *id.*, but a more detailed discussion of these sources of uncertainty lies outside the scope of this Article.

59. Burk & Lemley, *supra* note 7, at 1749.

60. Hadfield, *supra* note 9, *passim*. The likelihood is that any given outcome will instead fall along a probability distribution. Anthony D'Amato, *Legal Uncertainty*, 71 CALIF. L. REV. 1, 13 (1983); Giuseppe Dari-Mattiacci, *Errors and the Functioning of Tort Liability*, 13 SUP. CT. ECON. REV. 165, 166 (2005).

61. Golden, *supra* note 14, at 323.

Likewise, if the interpretation of a patent's claims is uncertain, a competitor in the same field may not be certain of the bounds of the patent and how to avoid trespassing them.[62] As a result, the competitor may underinvest in avoiding infringement and even unwittingly reinvent what another has already patented. Alternatively, a risk-averse competitor may over-invest in avoiding infringement, possibly by staying out of the field altogether and thereby decreasing competitive alternatives in the market.[63] Unpredictability is also thought to raise both transaction costs and the likelihood of litigation due to the lack of a stable and consistent background against which parties may negotiate over patents.[64] When suits for infringement do occur, unpredictability in patent claim meaning increases judicial burdens and decreases the likelihood of settlement.[65]

To be sure, despite the risks of uncertainty, many situations depending on patent claim scope do not seem to be unduly affected by uncertainty. For example, most cases either settle or result in renegotiated licensing terms, largely avoiding the issue of the claims' exact scope.[66] In other cases, common sense or common knowledge dictates what falls clearly within or without the boundaries of the patent.[67]

Nevertheless, many critics still worry whether the current patent claiming system leads to adequate certainty in patent scope. One popular way by which critics try to measure that certainty is by comparing it to the predictability supposedly enjoyed in defining real property boundaries, and the conclusions have not been favorable.[68] First, if the patent system were as clear as real property regimes in notifying potential trespassers of what has been claimed, innovators like RIM would not be caught in unknowing infringement of another's patent rights.[69] Second, the uncertainty of patents means they are difficult to enforce without costly litigation, thus lowering the patents' value and imposing costs on others.[70] The prolonged five-year lawsuit between RIM and NTP is a prime example of the resources spent by parties and courts in establishing the boundaries of a given patent. Third, critics argue that the uncertainty of patent claim meaning deters investments

62. Newman, *supra* note 12, at 65–66.

63. Nard, *supra* note 14, at 788–90.

64. Gregory D. Leibold, *In Juries We Do Not Trust: Appellate Review of Patent-Infringement Litigation*, 67 U. COLO. L. REV. 623, 645–46 (1996).

65. Golden, *supra* note 14, at 323.

66. Robert E. Scott & George G. Triantis, *Anticipating Litigation in Contract Design*, 115 YALE L.J. 814, 817–18 (2006).

67. *E.g.*, Burk & Lemley, *supra* note 7, at 1782 ("Of course, some infringement cases will prove to be blatant, free-riding misappropriation of the inventor's contribution . . . . "); *see also* BESSEN & MEURER, *supra* note 10, at 152–53 (describing chemical patent claims as "straightforward").

68. BESSEN & MEURER, *supra* note 10, *passim*.

69. *Id.*

70. *Id.* at 1–2, 152–53; JAFFE & LERNER, *supra* note 13, at 171; Golden, *supra* note 14, at 323; Moore, *supra* note 14, at 28; Nard, *supra* note 14, at 761–63.

in technology due to the high costs of enforcing patents or defending against patent infringement. The failure of patent claims to match the certainty of real property regimes thus imposes costs that are a drag on invention and innovation.[71]

Even the critics, however, recognize that perfect symmetry between the supposed clarity of real property boundaries and the clarity of patent claims is, at best, an ideal.[72] Patent "property" and real property differ in ways that significantly affect any analogy between the two. The most often recognized difference between intellectual "property" and tangible forms of property such as real estate is that intellectual property covers *res* that are intangible. Real and personal property rights protect tangible commodities such as land, buildings, and vehicles. The boundaries of these commodities are defined by the commodities' physical characteristics, including directions and distances from landmarks or other physical points of reference.[73] Patents, on the other hand, protect non-physical, intangible concepts, techniques, and ideas.[74] Such intangibility does not lend itself well to clear delineation, for it is "hard to draw a boundary around an idea."[75] Both the inherent limitations of language in expressing abstractions and the lack of physical referents for demarcating boundaries lead to a situation in which, although we may know exactly what we mean, we cannot express that meaning in a way that reliably can be communicated.[76]

Even a comparison that takes into account the distinction between tangible and intangible property fails fully to appreciate the difference between property and patents, moreover. The problem is not just that patentable ideas are intangible or even that the technologies involved are often complex.[77] As the next Part explains, patentable ideas are intangible not just because they are ideas but also because they are ideas about how

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71. Lemley, *supra* note 20, at 1060–62.

72. *E.g.*, BESSEN & MEURER, *supra* note 10, at 5.

73. JESSE DUKEMINIER ET AL., PROPERTY 516 (6th ed. 2008).

74. *E.g.*, BESSEN & MEURER, *supra* note 10, at 9–10; Lemley, *supra* note 20, *passim* (distinguishing intellectual property from "tangible property"); Newman, *supra* note 12, at 65.

75. *See* BESSEN & MEURER, *supra* note 10, at 32; Burk & Lemley, *supra* note 7, at 1744 ("[C]laim construction may be inherently indeterminate: it may simply be impossible to cleanly map words to things."); Golden, *supra* note 14, at 324 n.14; Paul M. Janicke, *On the Causes of Unpredictability of Federal Circuit Decisions in Patent Cases*, 3 NW. J. TECH. & INTELL. PROP. 93, 97 (2005) (asserting that the unpredictability of claim construction is, "to a large extent, an expected byproduct of a legal system that tries to express technical exclusivity with words"); Schwartz, *supra* note 13, at 259.

76. *See* BESSEN & MEURER, *supra* note 10, at 55 ("[I]t is much more complicated to map the boundaries of a technology from a verbal description than it is to map a plot of land using a standardized surveyor's description."); Janicke, *supra* note 75, at 97 (and sources cited therein); Schwartz, *supra* note 13, at 259–60; *see also* Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 562–63 (1992).

77. *See* BESSEN & MEURER, *supra* note 10, at 55–56 (suggesting that "[p]erhaps in an earlier time, when technology was simpler, [certainty in patent claim boundaries] was not such a serious problem because the ambiguity of patent claims was not so great").

to use things and resources. Patentable inventions are also always novel and unique. These widely unacknowledged differences between real property and patentable ideas suggest that tangible property is not the proper baseline for evaluating the certainty or uncertainty of patent boundaries.

II. CRITIQUE OF THE PATENTS-AS-PROPERTY ANALOGY

As suggested above, beyond the rather basic distinction between patentable ideas and real property based on tangibility, there are a number of even more fundamental differences that throw into grave doubt any analogy between the two regimes. First, patentable ideas are not just intangible but also conceptual in a way that necessarily focuses on utility and function. Patents can therefore be seen as not just property-like rules of exclusion but also regulation-like rules governing the use of resources. Patent claims are thus not so much the easily demarcated boundaries of a tangible property *res* but rather a much more complex and less easily defined set of prohibited uses.

Second, patentable ideas are, per design, always novel and unique in a way that defies easy description through standardization or propertization. These differences between patentable inventions and real property also suggest an even more fundamental difference in the purposes of the patent system compared to real property regimes. Any comparison between real property and patentable property must therefore necessarily falter.

A. *Uncertainty and the Conceptual Nature of the Patent* Res

Patent claims operate on two different levels. On one level, they operate as rules of exclusion. Patent claims set forth the boundaries of the patentee's property, signaling the scope of the patentee's exclusive rights over her inventive idea. On a second level, patent claims operate as complex rules of governance, prohibiting specified uses of the functional characteristics of objects in ways that would copy and therefore infringe the patentee's rights. The dual nature of patent claiming has far-reaching implications for how clearly patent claims can be delineated.

A patentable idea, sometimes called an inventive concept, is perhaps most easily understood as a specific technological solution to some real world problem that is new and non-obvious.[78] It can also be understood as the operative technical concept that defines how an invention works or how it achieves its desired result.[79] In *NTP, Inc. v. Research in Motion, Ltd.*, for

78. Hughes Aircraft Co. v. United States, 640 F.2d 1193, 1195 (Ct. Cl. 1980) ("The claims define the inventive concept that the patent embodies.").

79. Ronald Slusky, *Inventions Are Concepts*, 14 INTELL. PROP. TODAY 8, 8 (July 2007); Manual of Patent Examining Procedure (MPEP) § 1893.03(d) Unity of Invention [R-7] (8th ed. Rev. 8, July 2010) (referring to an "inventive concept" as "a technical relationship" with "technical features that define the contribution [that the] claimed invention, considered as a whole, makes over the prior art").

example, NTP's inventive concept was not a particular portable email device or even a particular wireless email system. Instead, the Federal Circuit summarized NTP's invention as the *idea* of "integrating existing electronic mail systems with RF wireless communications networks" so that travelers no longer had to plug their portable PCs into telephone jacks in order to access their incoming email messages.[80] NTP's technological concept included references to processors, gateway switches, interface switches, and other physical components,[81] but it was not these components or even a particular physical arrangement of them that NTP asserted as its "property." Rather, NTP's patent rights covered the system defined by its *use* of these electronic components to transfer incoming email messages over an RF network.

Unlike real property, patentable "property" *res* are thus highly conceptual in a way that concentrates on the functional and otherwise abstract characteristics of an invention. Although most technological ideas are ultimately embodied in physical forms such as machines, chemicals, mechanical devices, and physical processes, patent property rights do not cover those particular tangible embodiments or their components.[82] Indeed, the physical embodiments of any invention or the specific components used to make those embodiments are often the subject of entirely separate property rights.[83] Rather, the *res* of a patent's property rights is the intangible technological idea behind the invention.

The inventive concept behind an invention is a specific way of exploiting the dynamic relationships among specific tangible structures that create

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80. NTP, Inc., v. Research In Motion, Ltd., 418 F.3d 1282, 1288–89 (Fed. Cir. 2005). As mentioned previously, NTP actually sued RIM for infringement of a number of NTP's patents, but all the patents in the suit were divisionals originating from a single patent application. *Id.* at 1293.

81. *See, e.g.*, U.S. Pat. No. 5,436,960 claim 1. The additional detail about the components of NTP's inventive concept also satisfies the Patent Act's requirement that patentees describe their inventions with sufficient detail to enable others to make and use their inventions. 35 U.S.C. § 112 (2011).

82. Pfaff v. Wells Elecs., 525 U.S. 55, 60 (1998) ("The primary meaning of the word 'invention' in the Patent Act unquestionably refers to the inventor's conception rather than to a physical embodiment of that idea."); Fromer, *supra* note 24, at 725–26. Some court decisions have even taken pains to avoid requiring that an invention be "physical"—that is, involving physical or chemical materials—at all. *See, e.g.*, Bilski v. Kappos, 130 S. Ct. 3218 (2010); *In re* Bilski, 545 F.3d 943 (Fed. Cir. 2008).

83. Newman, *supra* note 12, at 105 ("Even though the patent claims describe a physical object—or to be more precise, a class of physical objects having functions and characteristics that fall within certain parameters—the right to exclude conferred by the patent does not pertain to any such actual corresponding object."). Similarly, the "first sale" or "patent exhaustion" doctrine refers to the fact that the purchaser of a copy of anything made from a patented idea or made according to a patented process is nonetheless the owner of that thing and has rights to use, resell, or otherwise transfer that item unfettered by claims of patent infringement. *See* United States v. Univis Lens Co., 316 U.S. 241, 252 (1942); Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502, 516 (1917); *see also* Glen O. Robinson, *Personal Property Servitudes*, 71 U. CHI. L. REV. 1449, 1452–53 (2004).

a new and useful result.[84] A patent thus claims an inventive idea not only as the new *res* of the patent's property-like rights but also as an exclusive, new way of using concrete components to create new utility.[85] This makes sense for a number of reasons.

First, and most importantly, the patent system exists to incentivize the creation of new and useful inventions, not to maintain or exploit existing property.[86] To accomplish this, the patent system quite logically concentrates on how an invention operates.[87] Indeed, accepted patent claiming practices specifically allow almost exclusive focus on the conceptual and functional attributes of an invention rather than ownership over its tangible embodiments or parts.

For example, method-of-use patents allow patentees to protect new uses of existing inventions, even if those inventions are subject to other types of "property" rights.[88] Under the Patent Act, "means-plus-function" claiming goes even further by allowing patentees to define inventions by the functions of their individual parts rather than the structures, materials, or even process steps for performing these functions.[89] A patentee may use the term "fastening means" rather than listing every type of tape, staple, brad, nail, glue, or other equivalent means.[90] Other examples of similarly function-oriented

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84. Thomas K. Landry, *Constitutional Invention: A Patent Perspective*, 25 RUTGERS L. J. 67, 73–74 (1993); Oskar Liivak, Rescuing the Invention from the Cult of the Claim 9 (Working Paper Series, 2011), *available at* http://ssrn.com/abstract=1769270. That is not to say that an inventor never needs to specify what components might display the requisite functional characteristics necessary for an invention to operate. I merely make the point that even when inventors do specify particular physical components, it is not their physical presence that they are attempting to patent but rather their use in the inventive concept. *Cf.* Oka v. Youssefyeh, 849 F.2d 581, 583 (Fed. Cir. 1988) (noting that patentable concepts include both a "directing conception" of the desired result and the means for achieving that result); *In re* Zahn, 617 F.2d 261, 270 n.2, (C.C.P.A. 1980) (Baldwin, J., dissenting) (making a similar point).

85. Newman, *supra* note 12, at 68.

86. *See infra* text accompanying notes 167–178.

87. 35 U.S.C. § 101 (1952) (providing for patent protection of "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof").

88. Schering Corp. v. Geneva Pharms., Inc., 348 F.3d 992, 994 (Fed. Cir. 2003) (Newman, J., dissenting from denial of motion for rehearing en banc); MPEP § 2173.05(q). In fact, a method-of-use patent might employ an invention that is covered under a separately owned composition-of-matter or manufacture patent. *Id.* Note also the distinction between patentable "utility," or the purpose of an invention, and "function," or how the invention operates. In method-of-use patents, the original invention still "functions" in the same way but now is being used for a different "utility" or purpose.

89. 35 U.S.C. § 112 (2006); Intellectual Sci. & Tech., Inc. v. Sony Elecs., Inc., 589 F.3d 1179, 1183 (Fed. Cir. 2009).

90. Elements listed in a means-plus-function format are interpreted as covering the structure, material, or steps the patentee listed as examples of the component in her specification as well as any equivalents thereof. Michael J. Meurer & Craig Allen Nard, *Invention, Refinement and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents*, 93 GEO. L.J. 1947, 1975 (2005).

claiming techniques are Markush claiming,[91] product-by-process claiming,[92] and terms of approximation such as "substantially" and "about."[93]

Second, modern patent claiming's emphasis on technological characteristics over physical ownership comports with the needs of efficiency. There may be many ways of executing or "practicing" an invention by substituting one equivalent part or parts for others.[94] In the means-plus-function claiming example above, the function of "fastening" is more important to the inventive concept at issue than the particular physical components used for that function. Functional claiming allows the patentee to economize on needlessly listing every single structure that would serve the purpose.[95]

These efficiencies also occur outside of means-plus-function claiming. Whenever an inventive concept takes the form of multiple physical examples, or embodiments, defining the invention by its technological concept rather than its various physical forms will save drafting costs. In NTP's case, for example, the court found that multiple models of RIM's BlackBerry handheld devices and the software used to operate them all infringed a single system claim in one of NTP's patents. Although these infringing models varied in size, shape, or additional functionality offered, they were all still embodiments of the same operative concept described in NTP's claim.[96]

If, however, NTP had been required to describe its invention not by its inventive concept but by listing every possible embodiment that could ever be made from that concept, the patent claim would have demanded volumes of text and some degree of clairvoyance. The costs of drafting such a claim would have been prohibitive, as would the costs of reading and understanding

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91. Markush claiming allows a patentee to claim an invention by listing interchangeable components rather than specifying each alternative structure or species of an invention. *Id.* at 1975–76 (and sources cited therein); Louis S. Sorell, *The Application of the Doctrine of Equivalents to Chemical Inventions: A Primer*, 11 ALB. L.J. SCI. & TECH. 225, 238 & n.68 (2001).

92. Product-by-process claiming "enable[s] an applicant to claim an otherwise patentable product that resists definition by other than the process by which it is made." *In re* Thorpe, 777 F.2d 695, 697 (Fed. Cir. 1985) (quoted in Irah H. Donner, *Combating Obviousness Rejections Under 35 U.S.C. Section 103*, 6 ALB. L.J. SCI. & TECH. 159, 229 (1996)).

93. Meurer & Nard, *supra* note 90, at 1975–76 (and sources cited therein) (noting acceptable use in patent claims of terms of approximation such as "substantially" or "about," rather than more definite measurements).

94. *See* Burk & Lemley, *supra* note 7, at 1780 ("The metes and bounds of a property line define a single physical entity, but the peripherally construed claims of a patent are directed to multiple theoretical entities."); *see also* Hughes Aircraft Co. v. United States, 640 F.2d 1193, 1195 (Ct. Cl. 1980) ("The claims define the inventive concept that the patent embodies. The specifications, on the other hand, are designed to reveal how the invention may be put into practice.").

95. *See supra* text accompanying notes 89–90.

96. NTP, Inc. v. Research In Motion, Ltd., 418 F.3d 1282, 1291 (Fed. Cir. 2005) (describing how BlackBerry 800, 900, and 5810 series handheld devices were all found to infringe Claim 15 of NTP's '960 patent).

the resulting patents.[97] Describing an invention by its conceptual and functional characteristics, by contrast, is more direct and more efficient. One can effectively explain the *concept* of "prime numbers" in less space than it would take to write the infinitely long list of every concrete embodiment of the prime number concept.

Finally, patent claiming's focus on inventive concepts serves an equitable purpose. If NTP had been required to describe its invention by its physical embodiments instead of its conceptual characteristics, the public would not have known what NTP considered the essential part of its inventions. Clever copyists could also have more easily designed around NTP's patents by simply swapping out one or two unimportant physical characteristics while still free riding on the inventor's idea. Defining its invention by its conceptual characteristics allowed NTP to claim rights over its entire idea, not just specific embodiments of it.

The conceptual nature of patent claims does tend to make them more "abstract," though, which affects their clarity. Despite functional claiming methods, technological concepts are difficult to describe in ways that fully communicate their boundaries. Technological concepts, particularly novel ones, inevitably strain the inherently limited capacity of language to define them.[98] For one thing, delineating concepts rather than physical structures means that a patent claim drafter lacks the physical referents on which a land surveyor or machinist might rely.[99] For another, patent drafters must grapple with the fact that the functionality and other non-spatial characteristics of their inventive ideas add further dimensions that defy clear description. The "abstract" nature of patent claiming thus stems to a great extent from its conceptual rather than physical focus.[100]

Many commentators have noted that some technologies are inherently more conceptual and therefore abstract and difficult to define than others.[101] For example, computer software and business method patents are often thought to be defined more by concept than chemical compound patents. The functional features of software depend less on specific physical components, while the function of chemical inventions correlates much more strongly to physical structure.[102] In fact, patents on technologies such as DNA sequences and proteins are often limited to only one or two structures because those are the only structures known to correspond to the functional

97. General Elec. Co. v. United States, 206 U.S.P.Q. 260, 1979 WL 25152 (Ct. Cl. Trial Div. 1979); Gillette Safety Razor Co. v. Clark Blade & Razor Co., 187 F. 149, 156 (C.C.D.N.J. 1911), *aff'd*, 194 F. 421 (3d Cir. 1912).

98. *See supra* text accompanying notes 74–76.

99. *See* Smith, *supra* note 12, at 1799.

100. *Cf. In re* Bilski, 545 F.3d 943, 963 (Fed. Cir 2008); BESSEN & MEURER, *supra* note 10, at 199.

101. *See* Bessen & Meurer, *supra* note 10, at 152–54, 162, 243–47.

102. *Id.* at 187–214, 244.

characteristics claimed.[103] As a result these patents enjoy fewer of the efficiencies of conceptual claiming because the relationship between structure and function is not as well understood. Nonetheless, a patentee's rights to such inventions still cover the inventive concept, not the structure. It is just that the inventive concept is known to map onto only one or two structures, making such inventions look as if they are more physical and less conceptual than other types of patents.[104] Patent "property" rights over an inventive concept are never limited to its physical embodiments, even if the concept is so narrow as to be practicable only as a single embodiment.

By contrast, process patents, like computer software patents, are generally considered more abstract than those of machines, manufactures, or compositions of matter because they correlate less strongly to particular physical boundaries,[105] with business method patents lying at the far end of that spectrum.[106] All the same, abstraction in patent claiming is not unique to these areas for all patent claims focus on function and other conceptual qualities, not on physical boundaries.[107]

Moreover, any attempt to exclude less physically bound technologies as too abstract would necessarily lead to debates over patentable subject matter, an issue itself fraught with uncertainty.[108] Patentable subject matter restrictions on business methods, software, biotechnology, and process patents require careful balancing of costs and benefits. There are many reasons beyond patent claim clarity to question whether business methods or software qualify as patentable subject matter. Business methods and software may not be "technological" enough because they are not applications of laws or phenomena of nature but rather more human phenomena.[109] Similarly, biotechnological inventions are often seen as potential phenomena of nature or as lacking enablement.[110] Nonetheless, the courts and the United States Patent and Trademark Office ("PTO") have resisted excluding entire categories of inventive concepts because the net benefits from doing so are

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103. *See, e.g.*, Dan L. Burk, *The Problem of Process in Biotechnology*, 43 HOUS. L. REV. 561 *passim* (2006).

104. *Cf. id.*

105. *See, e.g.*, Smith, *supra* note 12, at 1796–97, 1799.

106. *See, e.g.*, Bilski v. Kappos, 130 S. Ct. 3218 (2010); *In re* Bilski, 545 F.3d 943 (Fed. Cir. 2008); Newman, *supra* note 12, at 104–05. *But see* JAFFE & LERNER, *supra* note 13, at 145 (noting that patent scope overbreadth in business method and software patents also stems in part from the vagueness of prior art and lack of PTO examiner expertise in those fields).

107. *Cf.* Newman, *supra* note 12, at 105–06 (arguing that machine patents are just as much rules of governance as business method patents).

108. BESSEN & MEURER, *supra* note 10, at 244–45; Michael W. Carroll, *One For All: The Problem of Uniformity Cost in Intellectual Property Law*, 55 AM. U. L. REV. 845, 893 (2006).

109. *See, e.g.*, In re *Bilski*, 545 F.3d at 1009–10 ("[A] process is non-technological where its inventive concept is the application of principles drawn not from the natural sciences but from disciplines such as business, law, sociology, or psychology.").

110. BESSEN & MEURER, *supra* note 10, at 68.

unclear.[111] For example, it is not clear that any gains in patent claim clarity from excluding such inventions would outweigh any potential loss of incentives to their inventors.[112] Excluding such inventions from patentable subject matter could also upset established expectations.[113]

Regardless of our concerns about patentable subject matter, moreover, patent claims are necessarily "abstract" because they are rules of governance as well as rules of exclusion. Unlike a virtual, computer-generated version of a tangible object, or even an intangible "object" such as data or numerical values, patentable concepts are an entirely different form of property *res*.[114] Patent claims therefore are both use-oriented and exclusion-oriented.

To understand patent claims as use-oriented rules of governance, one might more accurately analogize patents to a real property regime in which owners could claim property rights over specific uses of real property. Such a regime might, for example, grant ownership rights over a particular use of soil on any and all real property plots. Imagine further that such ownership rights define the particular use as modification of the soil to a pH, organic matter content, and water content all within specified ranges, perhaps because this soil composition is conducive to cultivating a certain type of bean.[115] The exact composition of the soil is unimportant, for the owner could define his rights as extending over the entire range of acid, organic matter, and water content that functions to grow beans. As long as the acidity and water and organic content of any soil were modified to within the ranges specified, all would be "embodiments" of the invention.

Note the broad compass that such use rights would grant. The owner of these use rights could assert them regardless of the location or ownership of the soil. And although the owner of these rights originally claimed them because of the soil's utility in growing beans, his rights would not be limited to that utility. If the owner of a different plot of land were to modify her soil for reasons entirely unrelated to bean cultivation—and even if she herself

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111. *Id.* at 244–45; Michael W. Carroll, *One for All: The Problem of Uniformity Cost in Intellectual Property Law*, 55 AM. U. L. REV. 845, 893 (2006) ("The courts have resisted using discretion to sustain categorical exclusions from patentable subject matter, finding this to be too crude a filter.").

112. JAFFE & LERNER, *supra* note 13, at 203–04 (noting the difficulties of empirically evaluating the differential effects of the patent system on various technologies).

113. *See, e.g.*, Ass'n for Molecular Pathology v. U.S. Patent & Trademark Office, 653 F.3d 1329, 1366–68 (Fed. Cir. 2011) (Moore, J., concurring). Congress has recently, however, decided to exclude two categories of invention: those "directed to or encompassing a human organism," Leahy-Smith America Invents Act, P.L. 112-29, § 33, 125 Stat. 284-341 (2011) (limiting 35 U.S.C. § 101), and "any strategy for reducing, avoiding, or deferring tax liability," *id.* § 33 (limiting 35 U.S.C. §§ 102 and 103 such that tax methods "shall be deemed insufficient to differentiate a claimed invention from the prior art").

114. *Cf.* Moringiello, *supra* note 17, at 183–89 (noting the applicability of property law to virtual versions of tangible property).

115. For reasons that will become clear in the next section, assume also that this particular range of soil composition does not occur naturally and that the owner of these use rights was the first to discover it. *See infra* text accompanying notes 152–154.

had method-of-use rights on some other use for the soil—the owner of the soil composition rights could immediately sue her for trespass as long as her modified soil fell within the owner's functionally defined rights.[116] Thus, depending on how often people modified the soil on their plots to fall within the specified parameters, a very large number of plots might lie within the metes and bounds of the owner's property rights. If real property *res* were truly analogous to patent *res*, we would have a very different real property regime indeed!

This revised real property analogy also illustrates how the functional and conceptual delineation of rights in patent claims is at least as much about use as it is about exclusion. The scope of the owner's property rights is defined solely by the functional characteristics of the soil. The owner therefore has the right to exclude all others from using his concept of modifying soil to fall within his specified range of composition. The inventor would not necessarily have the right to use that modified soil himself if he has no rights to possess the soil physically. Nonetheless, he would have the right to prevent others from modifying their own soil. These soil owners would simply have to recognize that their possessory rights were now subject to restrictions on their use.

In much the same way, patents can be seen as rules of governance concentrating on use, not on the physical possession of resources. Patent law forbids anyone from making, using, selling, or offering to sell a patented invention without the patentee's authorization. Unlike real property rights, however, merely possessing or otherwise trespassing on any given physical embodiment of that invention does not constitute infringement of the patent.[117] Patent law's disregard for physical possession emphasizes its focus on *use*. Because patent rights are directed to technological concepts rather than physical "things," the claims defining patent rights do not highlight the physical boundaries of those "things" so much as their permissible and impermissible uses.[118] Thus, although it is tempting to think of patents primarily as property rights, they are also in large part rules of governance.[119]

Rules of governance differ from rules of exclusion in that they proscribe the use of resources rather than the ownership or possession of those resources. Patentable inventions and other types of intellectual property are widely viewed as non-possessory and non-rivalrous, although this view has come largely from the patents-as-property perspective. Because patentable

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116. Again, the "utility" of an invention is distinct from its "function" as those terms are used in this Article. *See supra* text accompanying note 89. In this example, the utility of the modified soil is to grow better beans. The soil's function lies in how the modified pH, water content, and organic matter content interact to make that utility possible.

117. Newman, *supra* note 12, at 105.

118. *Cf.* Lemley, *supra* note 20, at 1042, 1072 & n.166 (noting that intellectual property injuries can be characterized under tort rather than property).

119. Newman, *supra* note 12, at 68.

ideas are intangible property, they can be used without being consumed and without precluding simultaneous use by others. But really, to say that patent property *res* are non-rivalrous is merely to advert to the fact that, as rules of governance, patent claims proscribe uses, not physical possession.

Regardless of whether we view patentable inventions as property or as rules of use, moreover, their non-possessory nature has a number of implications for the level of certainty they provide.[120] One well-recognized implication is that patent property rights are more prone to innocent infringement because they lack the automatic notice that comes with the rivalrousness of physical possession.[121] Functional and conceptual characteristics, by contrast, are often difficult to observe and measure directly. Even patentees themselves cannot easily detect when their inventions are being made, used, or sold and therefore infringed. Many non-owners may be well entrenched in infringing on a patent by the time that either they or the patentee realize what is happening.[122]

Consider again the real property example above in which ownership is claimed by functional characteristics such as soil composition. Under this method of claiming rights to land, the claimed characteristics might affect multiple plots of land outside the claimant's physical possession. The claimant therefore might not even know about all of the various plots that fall within his ownership rights. Indeed, the particular plots that fall within his rights might change over time, as various plots gain or lose the characteristics by which his rights are defined.[123] The claimant himself might be the cause for such changes because he might use up the organic or water content of the soil. Although these resources themselves are consumable, however, the fact that the claimant has defined his rights by functional characteristics rather than by physical boundaries means that he could simply shift his rights to other plots of land whose characteristics meet that definition. The claimant would never be limited to a single plot or even single group of plots, as the plots that fall under his ownership rights would be potentially

120. Note that here "possession" refers to dominion over a physical resource, such as the physical embodiment of an invention. Under this definition, intellectual property *res* are non-possessory goods. *See supra* text accompanying notes 41–44. When addressing the validity of a patent, however, the PTO and the courts often use the term "possession" in a different manner to refer intellectual dominion over an inventive concept, such as through enablement, written description, or actual reduction to practice, as a way of proving completion of an invention. *See, e.g.*, 35 U.S.C. § 112 (2006); Guidelines for Examination of Patent Applications Under 35 U.S.C. 112, ¶ 1, "Written Description" Requirement, 66 Fed. Reg. 1099-01 (Jan. 5, 2001). These two types of "possession" are sometimes used interchangeably. *See, e.g.*, BESSEN & MEURER, *supra* note 10, at 64–68. The two types should be carefully distinguished, however, especially when used in relation to the clarity and public-notice function of patent claims.

121. *See* BESSEN & MEURER, *supra* note 10, at 34, 248–49; LANDES & POSNER, *supra* note 41, at 14.

122. *See* LANDES & POSNER, *supra* note 41, at 15–16.

123. *Cf.* BESSEN & MEURER, *supra* note 10, at 63–64 (noting the difficulties of defining property rights over animals or other resources that may migrate).

ever-changing. Under this alternative, patent-like system of defining real property rights, mere physical possession of a particular plot of land by the claimant therefore is irrelevant as a way of signaling ownership.

Finally, the revised analogy between patents and real property helps us appreciate another seldom acknowledged phenomenon that distinguishes the patent system from real property regimes: the inevitability of overlapping rights and the effect of these overlapping rights on the clarity with which those rights can be delimited. The conceptual and use-based nature of patent rights leads to overlap in two ways.

First, patents create overlapping rights because, as explained above, they are rules of governance that affect how others may use their own property. Patent rights in an inventive idea will overlap with others' property rights in the physical components and other resources that may be necessary to implement the inventive idea. In the example above, a person who owns use rights in soil modified to fall within his claimed range of acidity, water content, and organic content may not be able to practice that use if he does not own the soil himself. Similarly, the owner of the modified soil will not be able to use the patentee's modifications because she does not own the rights to modify her soil in this particular way. Both "owners" will have to negotiate with one another to use their overlapping rights.

Second, patents create overlapping rights because separately patented inventive ideas must often be combined in order to create a marketable good. For example, while NTP owned a variety of patents on how to transfer incoming emails wirelessly from wireline electronic mail systems, RIM owned patent rights on how to make that transfer without the user having to initiate it.[124] Although RIM had been using its own patented technology in its BlackBerry system, the suit by NTP demonstrated that RIM could not continue to use that technology without simultaneously infringing NTP's patents. Conversely, NTP, a non-practicing patent holder, could not have used its patents rights in a system that trespassed on RIM's patent rights in a non-user-initiated email transfer system. Both patented inventive ideas achieved slightly different ends, but they covered overlapping technologies.

RIM and NTP are hardly unique in this situation. Mutually overlapping patents are common and are often called "blocking" patents because they effectively block each owner's use of its own patents without the consent of the owner of the other overlapping patent. Depending upon the industry, the conceptual *res* of two separate patents may overlap in complex and often unpredictable ways.[125] In the electronics industry, for example, many

124. U.S. Patent No. 6,219,694 (filed May 5, 1998); Press Release, RIM, Research In Motion Files Wireless Patent Complaint Against Glenayre Electronics, Inc. (May 17, 2001), *available at* http://press.rim.com/release.jsp?id=530.

125. Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1588–90 (2003).

separately patented but complementary technologies must be coordinated in order to manufacture a single cell phone.[126]

The inevitably overlapping nature of patent rights is important because it also creates uncertainty in patent claim boundaries. It is difficult to define where one overlapping right stops and the other one starts, particularly because the object of the rights is conceptual. Indeed, it is more accurate to say that patent rights are not merely overlapping but in fact intermeshed. Although a patent holder can simply decide not to use the part of his inventive idea that overlaps with another patented idea, it is frequently the case that the two overlapping patents are so interrelated that one or the other patent holder is completely blocked from using his patented idea,[127] as was the case for RIM.

This lack of an affirmative right to use one's own inventive concept occurs because others' overlapping patent rights effectively act as negative easements on one's own patent rights.[128] And lest we forget, patent rights overlap not just with other patent rights but with tangible property rights as well. As noted in the revised real property model above, patents create rules of use that impose negative easements over the tangible resources used to make or operate the protected inventive concept.[129] Unsurprisingly, then, overlapping rights are much more common in intellectual property than in tangible property regimes.[130]

Unlike real property servitudes, though, the use restrictions created by patents are not standardized or restricted in form nor must they be based on any privity with the underlying property burdened with them.[131] To be sure, overlapping property interests such as easements, overlapping estates, and concurrent ownership occur in real property. Occasionally even real property *res* themselves may overlap, as in the case of condominium rights.[132] Nevertheless, overlapping real property *res* are uncommon, and even overlapping real property interests are limited through the use of zoning, use

126. *Id.* at 1590–91.

127. *E.g.*, BESSEN & MEURER, *supra* note 10, at 30.

128. *See id.* Some attribute the lack of an affirmative right to use one's own invention to the non-rivalrousness of the patent *res*. *See, e.g., id.* at 6. This seems counterintuitive, however, given that by definition, non-rivalrousness further lowers the likelihood of any interference between two uses of the same resource. If we view patent claims not as boundary definitions but as rules of use (and in particular as rules prohibiting certain uses), however, the lack of an affirmative right to use one's own invention despite its non-rivalrousness begins to make more sense.

129. Newman, *supra* note 12, at 105.

130. *See* BESSEN & MEURER, *supra* note 10, at 40–41, 53–54; *see also* Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The* Numerus Clausus *Principle*, 110 YALE L.J. 1, 12–17 (2000) (noting that, although still extant, overlapping rights in real property are at least limited and standardized).

131. Newman, *supra* note 12, at 106–07; *see also infra* notes 181–187.

132. Mixon & Otto, *supra* note 19, at 423; Mark D. West and Emily Michiko Morris, *The Tragedy of the Condominiums: Legal Responses to Collective Action Problems after the Kobe Earthquake*, 51 AM. J. COMP. L. 903 *passim* (2003).

restrictions, reversions, and other methods for minimizing non-possessory and concurrent rights.[133] No such doctrines mitigate the inevitable overlap in patent rights. Indeed, compared to real property, overlapping rights effectively define patentable property.

B. *Uncertainty and the Novelty and Defeasibility of the Patent* Res

Whether as rules of exclusion or rules of governance, patent claims are subject to additional obstacles that limit their ability to provide *ex ante* clarity. A significant but often overlooked source of uncertainty in setting patent claim boundaries is the requirement that each and every patent property *res* be novel.[134] Unlike real property regimes, the patent system is not designed to incentivize management of already existing property *res*. Rather, patents are designed to incentivize the constant creation of new technological concepts for eventual release into the public domain. The Patent Act demands that every invention be a technological development that has never before existed.[135] The *res* of a patent will therefore always be a unique entity that has never been propertized.

The mandatory novelty of patent *res* thus creates additional obstacles to clear boundary definition not seen in real property regimes. First, each *res* must be evaluated for patentability through an information-intensive examination process, for unlike real property regimes, there is no presumption of propertizability. Indeed, patentable inventions are propertizable only briefly if at all. This reflects the different purposes of the patent system compared to tangible property systems. Second, the necessarily unique nature of each patentable *res* defies easy definition through standardization. Third, although patentable inventions must be novel, they are also cumulative in nature, thus increasing the likelihood of overlap.

Although patent practitioners and scholars usually use the term "novelty" somewhat more specifically, inventive ideas must be novel in at least two different respects in order to be patentable. Under the patentable subject matter provisions of section 101 of the Patent Act, an inventive idea can never be a naturally occurring or otherwise already extant phenomenon, object, or even concept. Instead, a patentable concept must be "invented" *ab ovo* and not merely "discovered."[136] No one may patent naturally occurring organisms, algorithms, or other laws of mathematics, biology, chemistry, or physics, even if no one else had previously recognized them, for these are all

133. BESSEN & MEURER, *supra* note 10, at 43–44 (noting how property claims to oil, gas, and mineral rights can often overlap with competing claims to land rights).

134. *See id.* at 42.

135. 35 U.S.C. § 102 (2006).

136. *Id.* § 101; *see also* Diamond v. Diehr, 450 U.S. 175, 185 (1981) (reiterating that patent protection is not available for laws of nature, natural phenomena, and abstract ideas).

merely "discoveries," not "inventions."[137] Also, under § 102 of the Patent Act, the invention must never have been known, invented, described, or used by another. It is this latter type of novelty that most practitioners and scholars discuss when they use the term "novelty."[138] All the same, a patentable invention must represent both a change from nature and a new advance over technology already known.

The Patent Act thus requires that all patentable inventions be new and therefore non-fungible. Although one patentable concept may serve as a meaningful market substitute or even technological substitute for another patentable concept, no patentable concept can ever be identical to another known or naturally occurring concept. And although multiple inventors may independently hit upon the same concept, only one—the first—may assert patent property rights over it.[139] Any and all other subsequent inventors will have no rights over the concept. The best subsequent inventors can hope to do, if they want to acquire patent property rights similar to those of the first inventor, is to create similar and yet patentably different inventions themselves.

Tangible property *res*, by contrast, do not need to be novel. Real property *res* typically have long been in existence, divided into parcels, and even recorded as property by an entire series of previous owners by the time they are the center of a dispute. If patents were truly analogous to real property rights, any *res* of value, whether novel in any sense, would be propertizable, but that is clearly not the case.[140] Rather, novelty is one of the *sine qua non* of patentability. If we were to revise real property regimes to resemble patent law more closely, on the other hand, the novelty requirement under patent law would be akin to requiring that all real property rights holders be like explorers who continually find new lands to claim as their own but then turn those lands over to the public domain after twenty years. An even better analogy would to be to require those same explorers to discover not only new lands but also new forms of property rights, such as mining rights, water rights, and airspace rights, as well as new methods of using them.

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137. Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1, 2 (1992); Nard, *supra* note 14, at 776.

138. 35 U.S.C. § 102 (2006). The recently enacted Leahy-Smith America Invents Act, P.L. 112-29 § 3, 125 Stat. 284-341 (2011), greatly revised the novelty provisions under section 102 of the Patent Act as part of an overall shift from a first-to-invent to a first-to-file system in measuring the date by which an invention must be "novel." Most of these changes do not affect the analysis in this Article, however, as novelty will continue to be a fundamental basis for patentability.

139. Under the current Patent Act, the "first inventor" is the first actually to invent the claimed invention. 35 U.S.C. § 102 (2006). Under the Leahy-Smith America Invents Act, the "first inventor" will switch for the most part to the first to file a patent application on the invention.

140. *See* Stephen L. Carter, *Does It Matter Whether Intellectual Property Is Property?*, 68 CHI.-KENT. L. REV. 715, 718 (1993) (noting that if patents were truly treated as property, mathematical algorithms and phenomena of nature would be patentable).

As both rules of governance and as novel *res*, a constant stream of new inventive ideas presents a property recording agency with challenges in describing the metes and bounds of such new property and in determining whether it should be declared "property" at all. Given that inventions are conceptual, one cannot simply look at them and determine whether they are protectable. The requisite uniqueness of every patent property *res* means that the *res* has to go through a vetting process before it can be recognized (and protected) as "property."[141] The additional steps of creation, vetting, and recordation are thus additional factors that distinguish patentable property from tangible property, which typically does not need to go through any sort of vetting process. At most, tangible property may need to be surveyed or appraised and recorded. Patentable property must go through a number of more complicated steps.

The PTO has the duty to separate the patentable from the unpatentable through a process called patent examination.[142] The examination process varies from patent to patent but averages about three and a half years of a patent's total twenty-year term, in large part due to all of the inquiries that must be made before a patent may be granted. As described above, patent claims are thus designed not only to describe the inventive *res* of the patent but also to help determine whether that *res* should be afforded any rights to exclude others at all: that is, whether the invention claimed fulfills all the criteria necessary to warrant the right of exclusivity.[143]

In addition to novelty, the other main criteria for patentability are that the *res* be non-obvious, useful, and within the realm of patentable subject matter.[144] Patent property rights on inventions that do not meet these requirements are believed to be unnecessary, socially wasteful, or both.[145] No assumptions can be made based simply on similarity to previously patentable concepts.[146] Instead, patent examination is a multistep process much more complex than merely measuring physical attributes and spatial orientation. Because of its information-intensity, moreover, it is an ongoing process in which even inventions granted patent protection may have that protection taken away should invalidating information later emerge.

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141. BESSEN & MEURER, *supra* note 10, at 32, 53.

142. *Id.* at 32.

143. Cotropia, *supra* note 47, at 57.

144. 35 U.S.C. § 101 (2006) (defining patentable subject matter as "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof"); 35 U.S.C.A. § 103 (West Supp. 1997) (requiring that invention be nonobvious, novel, and have utility); *see also* Diamond v. Diehr, 450 U.S. 175, 185 (1981) (holding that patent protection is not available for laws of nature, natural phenomena, and abstract ideas).

145. 35 U.S.C. §§ 101–03, 112 (2006).

146. *Cf.* Moringiello, *supra* note 17, at 182–83 (citing Henry Hansmann & Reinier Kraakman, *Property, Contract and Verification: The* Numerus Clausus *Problem and the Divisibility of Rights*, 31 J. LEGAL STUD. 373, 382–84 (2002)) (noting that novelty makes the verification process difficult).

Moreover, patent claim drafters must carefully differentiate their inventions from all prior inventions ("prior art") to which they might be technologically related. Such differentiation often involves subtle and complex distinctions, particularly in densely populated fields of technology. Not surprisingly, patent drafters rarely if ever write the perfect claim the first time around. Usually there are multiple rounds of amendment to the patent's claims in order to meet patentability requirements. This means that a patent's claims continue to be uncertain in wording up until the final versions are drafted and granted by the PTO.[147]

For example, in *NTP, Inc. v. Research in Motion, Ltd.*, RIM likely did not even know of NTP's patents until NTP informed RIM and demanded that RIM pay licensing fees. Although NTP filed for patent protection as early as 1991, it took the PTO a number of years to examine and then grant the patents at issue.[148] In fact, the last of the patents that NTP asserted against RIM at trial did not issue until 2001, *after* commencement of the suit.[149] Because the exact interpretation of a patent's claims is pivotal in resolving whether a defendant has infringed that patent, such delay in issuing a patent creates a great deal of uncertainty for potential patent defendants.[150] But if the PTO were to forgo its current in-depth examination practices in order to prevent such delays in patent claim issuance, however, the PTO could find itself granting patent applications that do not meet the requirements of patentability as well as denying applications that do.

Indeed, even with its rigorous examination procedures, the PTO's ability to distinguish the patentable from the unpatentable is less than perfect, which frequently leads courts to invalidate improvidently granted patents.[151] Although the PTO is charged with the initial responsibility for examining patent applications, any patent or any claim within a patent describing an invention that fails to meet the patentability requirements will be denied

147. *But see* BESSEN & MEURER, *supra* note 10, at 53 (attributing delays in finalizing patent claims to continuations and other strategic efforts by patent applicants to "submarine" others in the field).

148. NTP, Inc. v. Research In Motion, Ltd., 418 F.3d 1282, 1288–89 (Fed. Cir. 2005) (explaining that the original patent application was subsequently divided into multiple applications, some of which were not issued until almost ten years later).

149. U.S. Patent No. 6,317,592 (filed Dec. 6, 1999) (issued Nov. 13, 2001); *see also NTP, Inc.*, 418 F.3d at 1287–89. All five relevant patents were granted on "continuations" of the original patent application filed in 1991, meaning that the inventions protected under each were originally disclosed in the 1991 application and are considered to have been filed *de jure* at the same time as the 1991 application. *See* 35 U.S.C. § 120 (2006). Although United States patent law does not allow patent holders to sue for infringement until a patent issues, once the patent is granted, patent holders may sue for enjoinder of any future infringement and even for reasonable royalties covering both the period after the patent application was published, 35 U.S.C. § 122(b) (2006), and the period the defendant actually had notice of the application, 35 U.S.C. §§ 154, 271 (2006).

150. BESSEN & MEURER, *supra* note 10, at 62–63, 160.

151. JAFFE & LERNER, *supra* note 13, *passim*.

protection by courts, even if the patent was vetted by the PTO.[152] In fact, patent rights are never definitively "valid," although issued patents do at least enjoy a presumption of validity rebuttable by clear and convincing evidence.[153] Any court asked to enforce a patent may therefore declare any or all of a patent's claims invalid if it decides that the claim should never have been granted. The risk of such invalidations creates additional uncertainty problems, as neither patent holders nor potential infringers can be certain whether a patent's claim boundaries are valid, much less where exactly they lie.

Disagreements over validity arise in two situations. A court may disagree with the PTO's determination that a patent's claims meet the various patentability requirements. Patent claim interpretation is a question of law, so a court later asked to enforce a patent's claims may decide to interpret those claims in a slightly different way such that they no longer meet patentability requirements.[154] In this situation, the court's interpretation supersedes any interpretation by the PTO, and the "reinterpreted" claims therefore become invalid. As critics point out, clarity as to the claims' meaning would obviously prevent these sorts of invalidations.[155] All parties involved, including the PTO and the courts, would likely interpret clear claims the same way.

But even if a claim's meaning seems perfectly clear, a potential infringer may still discover previously unknown references to relevant prior art showing that the invention at issue does not in fact meet the patentability requirements. In this second situation, a court would be obliged to invalidate the affected claim, but uncertainty as to the claim's validity could not have been prevented simply by a more clearly written claim. It is this latter source of uncertainty that ultimately cost RIM in its defense against NTP's patent infringement suit. RIM initially refused to settle the case, as it firmly believed that all the patents NTP was trying to enforce were invalid for a variety of reasons, including obviousness and lack of novelty over the prior art. RIM even presented several pieces of previously unknown evidence in support of its argument. The trial court rejected this evidence and refused to find the patents invalid.[156] RIM also asked the PTO to reexamine NTP's

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152. Patent rights have often been described as "contingent property rights" or "probabilistic property rights." Kesan & Banik, *supra* note 53, at 25; *see also* Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPECTIVES 75 (2005).

153. 35 U.S.C. § 282 (2006).

154. *See* Markman v. Westview Instruments, Inc., 52 F.3d 967, 978–79 (Fed. Cir. 1995), *aff'd* 517 U.S. 370 (1996) (establishing patent claim interpretation as a question of law).

155. *See, e.g.*, Joseph Scott Miller, *Enhancing Patent Disclosure for Faithful Claim Construction*, 9 LEWIS & CLARK L. REV. 177, 179–80 (2005) ("The Office should strive, in framing its content and format requirements, to produce a patent the claims of which a person having ordinary skill in the art can understand without the need for routine court intervention.").

156. NTP, Inc. v. Research in Motion, Ltd., No. 3:01CV767, 2003 U.S. Dist. LEXIS 14338, at *6–14 (E.D. Va. May 23, 2003).

patents, however, which the PTO did, finding the vast majority of all five patents at issue in the case to be invalid.[157] Such disagreements between the PTO and the courts are common.

While the potential invalidity of a patent's claims does not necessarily detract from the importance of clarity, it does begin to highlight yet another major difference between real property regimes and the patent system. First, drafting claims of clear and predictable scope becomes much more difficult when they might apply to unknowable future events such as the discovery of invalidating prior art. Discovering all relevant prior art at the time of drafting is a prohibitively expensive, time-consuming prospect and something of an infinity-minus-one proposition.[158] Unlike real property systems,[159] furthermore, the law provides no means other than the presumption of validity to protect against unknown, unrecorded blemishes on patent rights, such as invalidating prior art references.

Second, even those inventions that do meet the various patentability requirements become invalid, in a sense, when their relatively short patent terms expire. Again, patents last only twenty years from the date of filing the patent application. After the patent expires, the exclusive *res* of the patent becomes public domain. This stems in part from the goals of the patent system to incentivize the eventual dedication of new technologies to the public and to expand the wealth of public scientific and technological knowledge.[160] By both incentivizing technological advances and the inevitable release of rights to those advances, patents lay the foundation for future advances.[161] Under what is often referred to as the "patent bargain,"

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157. NTP, Inc. v. Research in Motion, Ltd., 397 F. Supp. 2d 785 (E.D. Va. 2005); *see also* Scott A. McKeown, *NTP's Last Stand: The Remnants of Patent Reexamination*, PATS. POST-GRANT (July 12, 2010), http://www.patentspostgrant.com/lang/en/2010/07/new-ntp-patent-suit-relies-on-non-existent-claims (and proceedings cited therein). *See generally* 35 U.S.C. §§ 311–318 (2006) (allowing *inter partes* patent reexaminations before the USPTO). On appeal, the Federal Circuit subsequently affirmed the PTO's reexamination decision as to the invalidity of one of those patents, *In re* NTP, Inc., 654 F.3d 1268 (Fed. Cir. 2011), and remanded for further reexamination as to the other four, *In re* NTP, Inc., 654 F.3d 1279 (Fed. Cir. 2011).

158. JAFFE & LERNER, *supra* note 13, at 21.

159. *See* DUKEMINIER ET AL., *supra* note 73, at 559.

160. As suggested above, the claims are not the only part of a patent that provide a detailed description of the invention protected therein. The "specification" of the patent includes text, diagrams, and other relevant information that describes the patented invention "in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same." 35 U.S.C. § 112 (2006). Both the specification and the claims are published eighteen months after the patentee files the application and remain part of the public record after the patent is granted. *Id.* §§ 111–13, 154(a) (4); 37 C.F.R. 1.11, 1.14 (1997). *See generally* Cotropia, *supra* note 47.

161. Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L.J. 1, 45–47 (2001); *see also* Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSPECTIVES 29 (1991) (noting the challenges of designing a system that rewards innovators while still fostering future innovation).

patentees offer up the resulting information to the public in exchange for a limited period of exclusive rights over their inventions.[162] The alternative would be for innovators to keep their technological breakthroughs secret, depriving the public of the eventual dedication of those inventions to the public domain and the information value of their patent disclosures.[163] The result would be wasted investments in reinventing the wheel and rediscovering old technologies.

Real property rights, by contrast, are potentially perpetual, and rights in chattel last as long as the chattel itself.[164] And although real property rights may change, they never just disappear. Real property is always owned by someone, even if it is just the government. By comparison, however, if patents can be said to grant "property" rights, those rights are at best defeasible.[165] In this way patents differ markedly from real property. Even full-term patent rights are at best analogized to an "estate" in land: inevitably defeasible, limited in duration, and intangible in its boundaries.[166]

Indeed, the structure of the patent system points to the futility of comparing tangible property boundaries with patent claim boundaries. Unlike real property, patent property is not intended to exist forever. Often, it is not intended to exist at all. Patent rights differ from tangible property rights in that they are sometimes defeasible through invalidation even before patent expiration, and their extremely short terms mean that they are almost immediately defeasible by design.[167]

The deliberate defeasibility of patent "property" rights comports well with the purpose of the patent system as opposed to that of tangible property systems. Tangible property regimes generally operate on the principle that the tangible *res* are consumable commodities that are subject to both the risk of congestion externalities and the tragedy of the commons; tangible properties and any investments in them quickly become depleted if no one has exclusive rights to them. The law grants such exclusivity in the form of property rights in order to limit the number of people who can use the commodity as well as to incentivize investments in maintaining it.[168]

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162. Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1037 (1989).

163. Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305, 308–09 (1992).

164. BESSEN & MEURER, *supra* note 10, at 32.

165. *Id.* at 2; Kesan & Banik, *supra* note 53, at 25.

166. Mossoff, *supra* note 20, at text accompanying n.7–9.

167. *See* Kesan & Banik, *supra* note 53, at 25. The term "defeasible" is typically used in property law to refer to a property interest, but not necessarily a property *res*, that may cease to exist upon the occurrence of some future event. DUKEMINIER ET AL., *supra* note 73, at 206–07. Here, the term is being used to refer to the cessation of both the property *res* and any interests in it.

168. The term "congestion externalities" refers to the idea that when a resource is limited and no one has exclusive rights to its use, no one will have the incentive to optimize current and future consumption of it. Instead, everyone will rush to use as much of the resource as they can

As explained above, however, inventive concepts are non-rivalrous. Multiple people may use an inventive concept without exhausting the resource or otherwise interfering with its use by others.[169] The patent system is therefore not designed to promote allocative efficiencies by avoiding such use conflicts as congestion externalities or depletion of resources.[170] Rather, the patent system is built to incentivize the creation and public release of technological information.[171]

To the extent that use of the information arising from a patent is limited at all, it is limited for only a short duration and only as to the specific invention claimed under the patent. All other use of that information is freely available to the public. Once a technological advance has been invented and put to public use and all the information gained from it is released to the public, there is often no reason to continue to protect the invention under property rights beyond the minimum amount necessary to recoup costs and to incentivize further investment.[172] Many scholars therefore view intellectual property rights such as patents not as "property" at all but rather as government subsidies.[173] The relatively immediate defeasibility of patent rights, compared to the potentially infinite duration of tangible property rights, reflects not only the different cost structure of propertizing information versus propertizing land or other tangible goods but also the different reasons for doing so.[174]

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before others can use it up, leading to rapid depletion of the resource. Similarly, the term "tragedy of the commons" refers to the lack of incentive not only to regulate use but also to invest in the resource because of the lack of exclusive rights to the returns on that investment. LANDES & POSNER, *supra* note 41, at 222–28; Dennis S. Karjala, *Congestion Externalities and Extended Copyright Protection*, 94 GEO. L.J. 1065, 1066–67 (2006).

169. LANDES & POSNER, *supra* note 41, at 226; Smith, *supra* note 12, at 1758. Although trademarks, and perhaps even copyrighted works, may be subject to congestion externalities in terms of "premature saturation of the market, consumer confusion, . . . and impaired demand for the original work because of the poor quality of some of the unauthorized derivative works," patented concepts generally are not thought to suffer any such risks. LANDES & POSNER, *supra* note 41, at 226; *see, e.g.*, Karjala, *supra* note 168, at 1081 n.43.

170. Smith, *supra* note 12, at 1744.

171. *Id.*; Burk & Lemley, *supra* note 125, at 1605. Of course, earlier in history, the potential for real property rights, particularly in areas that had not yet been settled or even explored, could also be characterized as incentives to discover property. Similarly, the potential for property rights in buildings or in personal chattels can be seen as incentives to create either of those as property *res*.

172. *See* LANDES & POSNER, *supra* note 41, at 21–24. *See generally* Lemley, *supra* note 20 (arguing that innovators do not need to capture the full social value of their inventions). Actually, returns on investments should slightly exceed costs in order to incentivize invention and its commercialization over alternative investments. *See* LANDES & POSNER, *supra* note 41, at 21–24.

173. *See, e.g.*, Lemley, *supra* note 20, at 1031; *see also* Smith, *supra* note 12, at 1744–45, 1784–85, 1793, 1796–97, 1800.

174. *Cf.* Carter, *supra* note 140, at 718 (noting no reason why, if patents are truly property, they should not last forever).

The inevitable defeasibility of patent rights, whether through invalidity or through patent-term expiration, is also a reflection of a larger notion that knowledge, even in the form of an inventive concept, is not something that should be privately owned.[175] Many scholars argue that the most important function of the patent system is not so much the short-term, individual property-like rights it grants but the overall expansion of technological knowledge it ultimately releases into the public domain.[176] Indeed, many inventors simply choose not to patent their inventions and instead offer them freely to the public.[177] The patent system thus provides only temporary exclusivity over an inventive concept rather than lasting property rights. The resulting norm is not that ideas are property but that ideas are not property, particularly if they have been around for some period of time.[178]

Beyond the costs of the vetting process, the requirement that each and every patentable invention must be novel and unique creates recordation and search costs as well. The novelty requirement makes it difficult to describe new patents in ways that are not only easily recognized but also categorized and catalogued in a searchable manner. In particular, the requisite uniqueness of patentable ideas precludes standardization of the way we describe those ideas and how we compare them to one another, especially given the wide range of sciences and technologies swept under the single one-size-fits-all patent banner.[179] We can therefore never neatly pigeonhole patentable concepts into a discrete *numerus clausus* type of system such as that seen in real property systems.[180]

The *numerus clausus* principle refers to closure of the set of property forms that the law will permit as enforceable. In real property, for example, the law has traditionally permitted the fee simple, the life estate, the lease, and a limited number of other interests. The virtue of limiting cognizable property interests to a few standardized forms is that it lowers the information costs of evaluating them, particularly when the interests relate to property that is intangible or otherwise problematic to observe or measure. Such information costs may be particularly steep for third parties unfamiliar with either the holder of a property interest or the *res* of that interest. Standardization through a *numerus clausus* approach thus creates efficiencies in

175. *Id.* at 717; Long, *supra* note 24, at 540.

176. Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CALIF. L. REV. 803, 810 (1988).

177. For example, many inventors choose to achieve exclusivity over their inventions through trade secrecy law, while others share their inventions with the public by publishing descriptions of the inventions or otherwise dedicating their inventions to the public domain. *See* Grady & Alexander, *supra* note 163, at 308–09.

178. Carter, *supra* note 140, at 717; Long, *supra* note 24, at 540.

179. Burk & Lemley, *supra* note 125, at 1588.

180. Newman, *supra* note 12, at 106–07.

addressing *in rem* rights by reducing the dimensions of a property interest that must be measured.[181]

Applying the *numerus clausus* principle to patent claims would seem on its face like the perfect idea. Intangible and highly conceptual patentable ideas are particularly onerous for third parties to identify and measure, and yet are fully enforceable against those third parties.[182] Standardizing the forms that those ideas can take would lower those third parties' information costs.

And indeed, patent law does employ something of a *numerus clausus* approach by limiting patentable ideas to those for a "process, machine, manufacture, or composition of matter," although those categories have been broadly interpreted.[183] Other than these loose categories, though, any type of *numerus clausus* treatment would be impossible to apply in describing each unique patentable inventive idea. Patentable ideas do not occur in neatly pre-existing, standardized forms; otherwise, they would be unpatentable for lack of novelty.[184]

As a result, neither those who draft patent claims nor those who interpret them can simply rely on references to existing technological concepts when trying to identify the novel aspects of the claimed invention. Technology advances apace, and what might serve as a relevant referent for describing today's new technology will be obsolete and irrelevant five years from now. Simply relying on established glossaries, treatises, or other standardizations of technical terminology prove unhelpful when that terminology is used to describe technologies that are constantly evolving.[185] Even the inventors themselves, with intimate knowledge of their inventions and the technological fields from which they come, have difficulty drafting patent claims due to the constant novelty of *res*.

In fact, the more novel an invention, the more abstract the patent claims on it are likely to be. An especially novel invention may fall completely outside of what is already known, with few recognizable reference points to describe it or to cabin its patent scope. The more pioneering the invention,

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181. Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 COLUM. L. REV. 773, 776–77 (2001); Merrill & Smith, *supra* note 130, at 3, 34; Francesco Parisi, *Entropy in Property*, 50 AM. J. COMP. L. 595, 625 (2002).

182. Newman, *supra* note 12, at 107.

183. 35 U.S.C. § 101 (2006); *e.g.*, Bilski v. Kappos, 130 S. Ct. 3218 (2010); Diamond v. Chakrabarty, 447 U.S. 303 (1980).

184. Smith, *supra* note 12, at 1755 ("'Invention space' and original expressions do not come pre-carved into things.").

185. Burk & Lemley, *supra* note 5, at 52 (suggesting that "the whole search for a 'plain' or 'ordinary' or 'settled' meaning of patent claims is doomed to failure"). *Contra* BESSEN & MEURER, *supra* note 10, at 239–40. Indeed, such difficulties may underlie some of the Federal Circuit's reluctance to rely too heavily on technical dictionaries or treatises in interpreting patent claims. *See* Phillips v. AWH Corp., 415 F.3d 1303, 1319–25 (Fed. Cir. 2005) (en banc); *see also infra* text accompanying notes 235–237.

the less likely it is to overlap with existing technology in the prior art.[186] A patentee may therefore claim her pioneering concept more broadly in uncharted waters. Such greater patent breadth is generally considered acceptable in those circumstances, as truly pioneering inventions are exactly the kinds of technological developments we most want to incentivize through the patent system. They represent huge advances in the useful arts and set the foundation for a wide variety of further development.[187] To the extent that we believe that patent scope should reflect the social welfare the underlying invention creates, pioneering patents should be broad.

Given that both novelty and breadth lead to abstractness in claiming, however, patent claims on pioneering inventions will inevitably be among the most abstract.[188] Pioneering biotechnology patents, for instance, are often characterized as "upstream research" because they set the ground for, and thus overlap with, any number of later developments. As these later developments based on the upstream biotech inventions evolve, they inevitably change the field as well as the meaning of the terms used in the field. This leads to what many see as changing claim meaning over time.[189] This kind of evolution and change is unavoidable, however, as all technology must build upon what came before it[190] and future technological advances are difficult to predict.[191] Simply disallowing the patenting of certain types of technologically abstract or pioneering inventions because of their tendency to evolve at a more or less rapid pace would eliminate vast swaths of new science and technology from the patent system.[192]

In addition, the patent system's requirement for novel patent *res* exacerbates the overlapping rights problem created by the uniquely conceptual nature of the patent *res*. Inventive concepts are cumulative by nature. It is often said that technology progresses by "standing on the shoulders of giants,"[193] and the cumulative nature of technological progress is clearly a foundational element of the patent system. Any rights in that technology will therefore tend to overlap, further exacerbating difficulties in delineating

186. *Cf.* BESSEN & MEURER, *supra* note 10, at 64–68 (noting a similar effect with regard to basic biotechnology research patents).

187. *See generally* Suzanne Scotchmer, *Protecting Early Innovators: Should Second-Generation Products Be Patentable?*, 27 RAND J. ECON. 322 (1996) (exploring the proper balance of returns between pioneering and follow-on inventors); *see also* Joshua Sarnoff, *Abolishing the Doctrine of Equivalents and Claiming the Future After* Festo, 19 BERKELEY TECH. L.J. 1157, 1205 (2004) (and sources cited therein).

188. *See generally* Burk & Lemley, *supra* note 125 (and sources cited therein).

189. *See, e.g.*, BESSEN & MEURER, *supra* note 10, at 64–68 (attributing the emergence of "upstream" biotech patents to patenting on federally funded academic research under the Bayh-Dole Act).

190. *See infra* text accompanying notes 241–243.

191. *See supra* text accompanying note 186; *infra* text accompanying notes 230–245.

192. *Contra* BESSEN & MEURER, *supra* note 10, at 27.

193. Scotchmer, *supra* note 161, at 29.

where one set of rights ends and the next begins.[194] This is in many ways the diametric opposite of the overlap problem faced by pioneering inventions. Whereas pioneering inventions are unlikely to overlap with either prior or current inventions in their fields, the cumulative nature of technology means that subsequent inventors are likely to overlap with others' efforts in the same area and therefore run afoul of their rights.

In fact, the cumulative nature of technological progress makes some degree of overlap inevitable. Even inventors completely independent of one another must all build upon the same prior art in their field. This commonality will therefore tend to channel their research efforts in the same directions, often toward similar ideas. The conceptual and non-possessory nature of technological ideas, however, means that those multiple independent inventors may be completely unaware of the parallel efforts of their peers.[195] The odds of those independent inventors developing identical or at least substantively overlapping inventive concepts is therefore quite high.

Indeed, most alleged patent infringers appear to be inventors acting in good faith to develop their own original ideas, rather than copyists or free riders.[196] For example, the RIM and NTP backstory explains in part why RIM was caught so unaware of its infringement of NTP's patents. Software developers for both NTP and RIM independently invented the same technology at about the same time, NTP first in the late 1980s to early 1990s, and RIM second in the 1990s.[197] Others, such as ALOHANet, were also working on this technology around the same time, raising real issues about the novelty and non-obviousness of NTP's patented ideas.[198]

Such "patent races" are common between inventors competing, whether knowingly or not, to be first to claim rights to the same or very similar inventive ideas. Inventors who are second in time are sometimes completely excluded from using their own inventions, either because their inventive ideas are identical to the first inventor's invention or because the second inventor's idea at least overlapped with the first inventor's idea.[199] Even if patent claims were drafted in perfectly clear language, inventors would inev-

194. Blair & Cotter, *supra* note 161, at 45–47; Scotchmer, *supra* note 161, *passim*.

195. BESSEN & MEURER, *supra* note 10, at 48–49.

196. *Id.* at 124. Some therefore advocate that such "innocent" infringers be allowed prior user rights or some other means of lessening liability under patent law's strict liability regime. *See, e.g.*, BESSEN & MEURER, *supra* note 10, at 249–52. The recently enacted Leahy-Smith Act may provide exactly such protections. Leahy-Smith America Invents Act, P.L. 112-29, § 5, 125 Stat. 284-341 (2011) (amending 35 U.S.C. § 273 to grant prior-user defenses to any third party commercially using any invention in good faith more than one year prior to filing or disclosure by the filing inventor).

197. NTP, Inc. v. Research in Motion, Ltd., 270 F. Supp. 2d 751, 755 (E.D. Va. 2003); *see also* McKenna et al., *supra* note 1; Stoughton, *supra* note 2.

198. NTP, Inc. v. Research in Motion, Ltd., No. 3:01CV767, 2003 U.S. Dist. LEXIS 14338, at *6–14 (E.D. Va. May 23, 2003).

199. *Cf.* BESSEN & MEURER, *supra* note 10, at 44 (describing similar problems in mining rights). *See generally* Scotchmer, *supra* note 161, at 30; Scotchmer, *supra* note 187, at 323.

itably overlap with one another in their inventive efforts. Other than the gold mine rush or Oklahoma land rush,[200] races for ownership are uncommon in real property regimes, marking yet another significant difference between patents and real property.

To summarize, patents resemble real property rights only superficially. Patents certainly grant inventors exclusive *in rem* rights over their inventive ideas, and these rights are fairly robust. Beneath that property-like surface, however, patent claims are also rules of use that frequently create negative easements on others' property. Patent claims as rules are therefore more prone to uncertainty than real property deeds, not only because they represent intangible rules of use but also because they are novel and unique, in keeping with their purpose to incentivize the creation and almost immediate release of inventive ideas into the public domain.

The next Part analyzes patent claims as rules of governance, examining in detail whether patent claims as rules can ever be expected to achieve certainty and clarity. The Part concludes that, for a number of reasons, patent claims cannot achieve such certainty and are better interpreted as more like standards than bright-line rules.

III. THE NEW VIEW: UNCERTAINTY AND PATENT CLAIMS AS RULES OF GOVERNANCE

For all the reasons discussed above, patent claims are not just boundaries marking exclusive rights to inventive and novel ideas but also specific rules governing the use of resources to create utility. Rules cannot provide much certainty when the future to which they apply is itself uncertain. This is particularly true when viewing patent claims as rules of governance, moreover, for rules of governance offer even less clarity and depend even more upon *ex post* interpretation than rules of exclusion. This Part therefore takes the analysis further and reorients it slightly by conceptualizing patent claiming as rules rather than as standards and examining how that reorientation affects the certainty of patent claim meaning.

Unlike real property boundaries, patent claims are not lines on a plat map or references to landmarks. Claims are written prescriptions, and like all written law, they can be couched as either rules or standards. The following analysis of patent claims as rules rather than standards thus benefits

200. The Homestead Act of 1862 allowed settlers to claim up to 160 acres, frequently leading to multiple settlers attempting to claim the same or overlapping plots of land. Only forty percent succeeded in obtaining title, with fraud and abuse of the claim resolution process. Homestead Act of 1862, ch. 75, 1862 Stat. 392 (repealed 1976); John Vaterlaus, *Stuck Between a Rock and a Hard Place: The United States Supreme Court Misapplies Statutory Construction Precedent in* Bedroc Ltd. v. United States, 38 CREIGHTON L. REV. 1263, 1263 (2005); *see also* M. Brent Leonhard, *There Are No Implied Easements over Trust Lands*, 33 AM. INDIAN L. REV. 457, 482–85 (2008) (describing some of the overlap created by the Homestead Act).

from the rich literature comparing rules and standards, particularly in terms of the certainty that each provides. Viewing patent claims through the rules-versus-standards lens helps explain why, despite patent claims' careful framing as rules, patent claims still face uncertainty in anticipating all the contexts to which they might apply. As such, we cannot expect patent claims to offer complete certainty *ex ante* but must accept that they must often be interpreted in light of their context *ex post*.

Rules and standards differ as to their flexibility and specificity as well as their relative time frames. The choice between rules and standards centers on whether to convey the law with specificity *ex ante*, before parties choose whether and how to act, or to provide only more general guidance, leaving the courts to decide *ex post* how to apply that guidance in each case.[201] A rule provides the specifics of the law ahead of time, often leaving only issues of fact for determination *ex post*. A standard, by contrast, *ex ante* provides only the rough contours of the law, leaving for later not only factual determinations but also determination of what exactly the law should be in the circumstances at hand.[202]

For example, a rule might specify *ex ante* that driving faster than sixty-five miles per hour on a highway is illegal. The only determination remaining would be whether a driver was going faster than sixty-five miles per hour and was doing so on a "highway." A standard, by contrast, might specify only that driving "in an unsafe manner" is illegal, leaving for later whether a given driver was in fact traveling at unsafe speeds as well as what range of speeds might be "unsafe" on that particular road at that particular time under those particular weather conditions.[203]

Patent claims clearly display many of the characteristics of rules particularly in their function as rules of exclusion.[204] Patent claims establish relatively clear, nearly absolute rights of exclusivity over the inventive ideas they protect. A patentee has the right to prevent others from making, using, selling, or offering to sell her invention regardless of identity or intent and regardless of whether the patentee is even harmed. Moreover, unlike copyright, patent rights are protected under a property rule and unfettered by possible compulsory licenses, experimental or fair use rights, or other equitable incursions. Treating patent claims as rules of exclusion relieves potential infringers of the need to collect and evaluate the information that

201. Kaplow, *supra* note 76, at 568–87.

202. *Id.*

203. Burk & Lemley, *supra* note 7, at 1778–79; *see also* Louis Kaplow, *The Value of Accuracy in Adjudication*, 23 J. LEGAL STUD. 307, 309 (1994); Kaplow, *supra* note 76, at 559.

204. *See generally* Burk & Lemley, *supra* note 7, at 1777–83 (noting the similarities between rules and the peripheral claiming system); Jeffrey A. Lefstin, *The Formal Structure of Patent Law and the Limits of Enablement*, 23 BERKELEY TECH. L.J. 1141, 1142–43 (2008) (characterizing the modern patent system as preferring rules over standards).

would otherwise be necessary to make these kinds of distinctions.[205] As long as the boundaries of the property *res* are clear, and as long as everyone knows on which side of those boundaries they stand, the information costs for all parties concerned should be minimal.[206]

And indeed, the ideal function of patent claims, as described above, is to give public notice of the boundaries of a patent holder's property-like rights to exclude all others by "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."[207] Claims that meet this requirement will *ex ante* inform the public and, if necessary, the courts of the boundaries of the claimed right to exclude others.[208] Some factual determinations will remain to be made *ex post*, as is true of the application of any rule. In patent law, the question of whether an allegedly infringing device does in fact infringe a given patent claim is considered to be a factual issue. In most cases, however, infringement is uncontested after the relevant patent claims have been construed by the court.

Belief in the virtues of specifying patent scope in this way prompted the adoption of the peripheral claiming system.[209] This modern system of patent claiming dates back at least to the Patent Act of 1870, when the peripheral claiming system was first codified. Before that time, patent law subscribed to the central claiming system, under which patents contained only background information and written and pictorial descriptions of the patented invention but no specific boundary-defining claims. The courts were left to determine the scope of a patentee's rights and any possible infringement thereof by discerning the "principle" or "essence" of the invention as described in the patent, as if measuring patent scope by a standard.[210]

Because of the inherent difficulties of defining the patentee's rights from the scattering of information contained in the specification, Congress changed the law to require claims specifically to "mark out the periphery or boundary of the area covered by the [patent]."[211] Patents must now include one or more claims in rule-like form so that they provide a detailed description of what the patentee considers her exclusive inventive idea. Great detail

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205. Smith, *supra* note 12, at 1746–48. *But see* Newman, *supra* note 12, at 63 (noting that after the Supreme Court's decision in *eBay, Inc. v. MercExchange LLC*, injunctive relief is not as guaranteed as it used to be).

206. Smith, *supra* note 12, at 1728.

207. 35 U.S.C. § 112 (2006). On patent claims as rules generally, see Burk & Lemley, *supra* note 7, at 1778–83; Fromer, *supra* note 24, at 757–60.

208. Nard, *supra* note 14, 788–96.

209. *See generally* Cotropia, *supra* note 47, at 64–65 ("The claim finds its roots in the need for an instrument to notify the public about the patent's scope of protection."); Fromer, *supra* note 24, at 731–35 (describing the development of the peripheral claiming system).

210. Burk & Lemley, *supra* note 7, at 1772.

211. Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1565 (Fed. Cir. 1995) (Nies, J., dissenting) (quoting RIDSDALE ELLIS, PATENT CLAIMS § 6 (1949)). *See generally* Cotropia, *supra* note 47, at 56–59 (explaining the scope-defining function of patent claims).

in patent claiming is believed to foster consistency and ease of interpretation by making claims more precise and saving others from having to risk interpretive errors in applying them.[212] Patent applicants are therefore expected to invest heavily in crafting their patent claims with as much detail as feasible.

The evolution from the central to peripheral claiming system is slightly more complex than described here, but for the most part, the rule-like claim is considered the sole determinant of patent scope.[213] By doing away with central claiming, the patent system intentionally gave up almost all flexibility in determining patent boundaries *ex post* under a more standard-like approach.

Patent claims are also rule-like in that they shift the burden of specifying legal liability *ex ante* onto their drafters, the patentees. Because rules and standards differ in the certainty they offer, they also differ in their relative cost structures and where they place the burden of those costs. Greater certainty involves greater *ex ante* costs, including the costs of crafting laws that are predictable yet precise.[214] By specifying the law in detail up front, rules offer more certainty and are therefore more useful when certainty in the law is important, such as when actors want to know what to expect of the law in order to allocate their investments accordingly. This may be particularly true when liability for violations is strict,[215] as is the case with patent infringement.[216] Rules are also more costly to draft because they shift onto the drafter the burden of anticipating and addressing all the possible contexts in which they might be applied.

Standards, by contrast, are less costly to draft but more costly to apply because they leave such determinations for resolution *ex post*. Standards are thus more effective in giving content to the law in a more context-dependent and often equitable manner. But they also lead to more discretionary outcomes that are difficult for parties to predict with certainty.[217]

In the end, these differences in cost allocation equate to a choice in burden shifting between the drafters of the law, the courts who interpret the law,

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212. 35 U.S.C. § 112 (2006); *see also* John F. Duffy, *The* Festo *Decision and the Return of the Supreme Court to the Bar of Patents*, 2002 S. CT. REV. 273, 308 (describing the central claiming system as too amorphous for juries).

213. Burk & Lemley, *supra* note 7, at 1745; Golden, *supra* note 14, at 348–62. While courts are required to interpret claims according to the specification of the patent, the specification is to be used only as an interpretive aid, not to substantively determine the boundaries of the patent. Golden, *supra* note 14, at 348–62.

214. Kaplow, *supra* note 203, at 308.

215. *See* Long, *supra* note 24, at 469.

216. Kelly Casey Mullally, *Patent Hermeneutics: Form and Substance in Claim Construction*, 59 FLA. L. REV. 333, 366 (2007) ("Concern with certainty is ubiquitous in legal rule-making. It is perhaps the most highly sought-after quality of claim construction."); *see* Sobel, *supra* note 35, at 6.

217. Burk & Lemley, *supra* note 7, at 1779; *see also* Daniel A. Crane, *Rules Versus Standards in Antitrust Adjudication*, 64 WASH. & LEE L. REV. 49, 52–55 (2007).

and the public who is subject to the law. Rules place the initial information burden on the drafting parties, potentially easing the burden on courts and the public. Standards shift the burden from the drafting parties to the courts in terms of *ex post* resolution of the law and to the public in terms of potential confusion about the law.[218] The appropriate locus of the burden ultimately depends on who is more efficiently able to bear it.

Switching back to patent claims, then, it makes sense that patentees should have to specify the boundaries of their patents *ex ante* rather than putting the burden on others *ex post*, as was the case under the central claiming system. In designing their own inventions, patentees generally will have made significant investments in researching the technologies that already exist in the field. Patentees are thus not only the most intimately acquainted with their own inventions but also possess the requisite information on the technical nature of those inventions and exactly what they have contributed to the field.[219] Accordingly, a patentee's information costs *ex ante* are generally much lower than those of a court or the public *ex post*. To the extent that we have decided to make patent claiming rule-like in its public-notice effects, patentees are best able to bear the burden of specifying *ex ante* the boundaries of their patents.[220]

Patent claims may specify *too much* up front, however. Again, claims describe inventive ideas that are highly conceptual, complex, and unique and do so in ways that must carefully distinguish all previously known ideas. The resulting claims often become quite complicated, placing a significant burden on the public and the courts to understand what those claims mean. As noted above, the more complicated a rule or standard, the greater the costs of understanding it.

Such complexity will not necessarily impair the efficiency of a rule or standard, however, if the relevant public already possesses the necessary private information or field-specific knowledge.[221] This is believed to be the case with regard to patent claims. Patents are generally thought to be most relevant to those working in the same technological field as the claimed invention. Patentees therefore are supposed to draft their claims so that a person having ordinary skill in the art ("PHOSITA") would be able to comprehend the claims without undue difficulty. Similarly, a court tasked with interpreting a patent claim should also do so from the perspective of a PHOSITA.

For all the benefits of drafting claims as rules in order to provide greater certainty *ex ante*, however, patent claim drafters must still contend with a

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218. Richard Craswell, *Offer, Acceptance, and Efficient Reliance*, 48 STAN. L. REV. 481, 547 (1996).

219. Long, *supra* note 24, at 468.

220. *See* Craswell, *supra* note 218.

221. *See* Louis Kaplow, *A Model of the Optimal Complexity of Legal Rules*, 11 J.L. ECON. & ORG. 150, 151 (1995); Carol M. Rose, *Crystals and Mud in Property Law*, 40 STAN. L. REV. 577, 609 (1988).

number of factors that ultimately cause a great deal of uncertainty in patent boundaries. As discussed above, the novelty of patent ideas means that inventors cannot simply refer to previous ideas or categories in drafting their patent claims. A second and perhaps more onerous obstacle to certainty is the unforeseeability of future events that those patent claims will be expected to address. Herein lies the crux of viewing patent claims as rules, for the spectrum between rules and standards revolves very much around anticipating future events *ex ante* versus coping with unforeseen events *ex post*.[222] Future technological developments are unpredictable, so to the extent that patent claims adopt some more standard-like qualities, they mitigate the problems posed by unforeseeability.

To appreciate this, one need only look at the relative merits of patent claims as rules of exclusion versus their merits as rules of governance. The concept of patents as rules of exclusion—as property metes and bounds—assumes a relatively static *res*. The value of that property *res* might vary over time, but the physical things that constitute the *res* themselves generally do not.[223] Patent claims as rules of governance, on the other hand, do not necessarily assume any such static existence around which the behavior to be governed will center. Rather, the behavior to be governed is identified not by some static tangible good but by some harm to avoid or benefit to achieve. These benefits or harms can be expected to vary over time as situations and even categorization (as "harmful" or "beneficial") may change over time.

Rules of governance are believed to be more costly to draft than rules of exclusion, moreover, because one must specify the resources that may be used as well as how they may be used in a way that achieves optimal allocative efficiency.[224] For example, a rule of exclusion would constrain trespass on a property in a more or less absolute fashion. In contrast, a rule of governance would constrain alleged nuisances in a more qualified fashion, taking into account the relative cost of avoidance, the net social value, and any other costs and benefits as between the alleged nuisance and quiet enjoyment of the property.[225]

Balancing cost-benefit ratios in this way is more information-intensive and costly than rules of exclusion. Rules of governance require investment in evaluating which uses to regulate and how to communicate those regulations in a way that is easily accessible to the affected parties. Also, the affected parties must invest in learning the rules and then in determining how those rules

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222. *See* Kaplow, *supra* note 203, at 307–11 (and sources cited therein); *see also supra* text accompanying notes 201–203.

223. Of course, it can be argued that real property boundaries are simply another form of rule-making and hence "rules" of exclusion, as they are simply an *ex ante* demarcation between legal conduct or use and trespass as illegal conduct or use. *See* Smith, *supra* note 12, at 1744–45, 1784–85, 1793, 1796–97, 1800.

224. *Id.*

225. Fromer, *supra* note 24, at 729; Smith, *supra* note 12, at 1746.

might apply to their particular circumstances. The more complex and numerous the rules, the greater these various costs.[226]

That is not to say that patent claims are inherently uncertain simply because they are rules of governance as well as rules of exclusion. Uncertainty about legal outcomes arises for a variety of reasons, most of which relate to the information costs of anticipating the future.[227] Perhaps one of the most challenging obstacles to efficient legal drafting is anticipating all the contingencies that can arise over time. The vicissitudes of time and changes in economics and technology can be impossible to predict, particularly where those potential changes are large in number and distant in time.[228] Attempting to provide for all possible contingencies could cause drafting and transaction costs to approach infinity.[229] Those who draft rules will most efficiently invest only in clarifying their meaning and anticipating contingencies where the marginal costs do not exceed the expected returns in clarity and protection.[230]

The prohibitively high information costs of anticipating every possible contingency therefore regularly lead to incompleteness in rule drafting.[231] As noted above, even bright-line rules are porous at their edges.[232] When rules are unable to address unforeseeable future events, those who must apply the rules may need to interpret them according to their spirit rather than their letter to maintain their original purpose. To this extent, rules such as patent claims may need to be interpreted as more similar to standards than pure bright-line rules.[233]

Patent claims in particular must contend with at least three types of unforeseeability. One source of uncertainty, as mentioned above, is the fact that references to previously unrecognized but potentially invalidating prior art may be presented at any point during a patent's lifetime.[234] Beyond this possibility, however, there is also the unforeseeability of future technological developments that might change the meaning of the claims and what they cover.[235] There is also the unforeseeability of the ways in which any alleged

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226. Newman, *supra* note 12, at 66, 78–79, 81.

227. *See* Hadfield, *supra* note 9, at 547.

228. *See id.* at 547–48.

229. Posner, *supra* note 30, at 1582 ("[P]erfect foresight is infinitely costly, so that, as the economic literature on contract interpretation emphasizes, the costs of foreseeing and providing for every possible contingency that may affect the costs of performance to either party over the life of the contract are prohibitive.").

230. Alan Schwartz & Robert E. Scott, *Contract Theory and the Limits of Contract Law*, 113 YALE L.J. 541, 545 (2003); Eric A. Posner, *The Parole Evidence Rule, the Plain Meaning Rule, and the Principles of Contractual Interpretation*, 146 U. PA. L. REV. 533, 540–41 (1998).

231. *See* Hadfield, *supra* note 9, at 547–48.

232. *Id.* at 546; Johnston, *supra* note 9, at 345.

233. *See* Landry, *supra* note 84, at 92–93.

234. *See supra* text accompanying notes 143–145, 148–151.

235. Kesan & Banik, *supra* note 53, at 31–32.

infringers will inevitably try to find loopholes in a patent's claims.[236] The following takes a closer look at each of these latter two contingencies in turn and how they affect the certainty with which patent claims can be drafted and interpreted.

First, the nature of technology means that the future of any given invention is inevitably uncertain.[237] An inventor may have difficulty gauging whether any other inventors will enter her same field and overlap or compete with her invention, how subsequent inventors might improve upon her invention, and even whether her invention will have any market value.[238] Technology often changes so quickly that even within the relatively short twenty-year lifespan of a patent, a claimed invention may become relevant in ways its inventor never expected, or it may become obsolete.[239] The value of technological ideas may vary wildly, not only over time but also across inventions. Some inventions, such as NTP's, may be worth millions and even billions of dollars, but the vast majority of patented ideas will be worth nothing.[240]

Similarly, the meaning of technical terminology may evolve over time along with the technology it describes, thereby changing the meaning of patent claims in unexpected ways.[241] The courts expressly acknowledge this fact by requiring that claim language be interpreted by its meaning at different times, depending on whether the claim is being evaluated for obviousness, novelty, definiteness, infringement, enablement, and so on.[242] To understand this, one need only consider how much the term "computer" has changed over time. Decades ago, "computers" were necessarily huge concatenations of processors that used punch cards and filled entire rooms. Today, we understand "computers" to be laptops, handheld devices, desktops, and even computers small enough to be implanted in the human eye.[243] How can a patentee drafting claims during the era of punch cards write those claims such that they still have meaning twenty years later during an era of floppy disks and hard drives?

Second, the scope of a patent claim is uncertain because of the variety of ways in which others might unwittingly or intentionally reproduce the

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236. *See* Burk & Lemley, *supra* note 7, at 1752–53 (noting litigators' skills in exploiting ambiguities).

237. Smith, *supra* note 12, at 1744–45, 1784–85, 1793, 1796–97, 1800.

238. Burk & Lemley, *supra* note 7, at 1782 ("But peripheral claiming stands this custody on its head, purporting to set forth the maximal boundary of the patent grant during the application process, before the measure of the inventor's contribution or the different variants that competitors might adopt can be properly assessed.").

239. Burk & Lemley, *supra* note 125, at 1591; Burk & Lemley, *supra* note 7, at 1782.

240. Lemley, *supra* note 20, at 1053.

241. BESSEN & MEURER, *supra* note 10, at 67; Lemley, *supra* note 7, at 105–10; Schwartz, *supra* note 13, at 260.

242. Lemley, *supra* note 7, *passim*.

243. Paul Adams, *This Is the Smallest Computer Ever*, POPULAR SCI. (Feb. 22, 2011), http://www.popsci.com/technology/article/2011-02/smallest-computer-ever.

idea behind an invention. Patentees will generally endeavor to draft claims that expressly cover all foreseeable but insignificant variations on their claimed inventions, but those variations are limited only by the ingenuity of potential infringers.[244] The costs of drafting against all potentially infringing variations quickly become prohibitive. As a result, patent claim language will inevitably contain inadvertent ambiguities and other loopholes that accused infringers can exploit in an effort to avoid liability. Given that these loophole cases are the most likely to be litigated, the courts and the public are most likely to notice those patents in which there is some uncertainty as to the scope of the claims.

Why are the costs of drafting against such loopholes prohibitive? As those most familiar with their inventive concepts, patentees are presumably in the best position to anticipate how those concepts might later be infringed and to draft more precise patent claims accordingly. The optimal precision of a rule depends on the variety of activities to which the rule may apply, however, and even patentees cannot possibly anticipate everything.

To understand the patentee's dilemma, one must consider the cost-benefit ratio that every patentee faces in drafting his or her patent claims. The more predictable the particular type of patent infringement, the more the patentee can efficiently draft precise patent claims that would prohibit such infringement.[245] Where the range of possible infringing activities is heterogeneous and the probability of any single type of infringement is low, however, the expected benefits of drafting claims covering such infringement are fewer. In fact, a patent claim drafter may rationally omit reference to an unlikely type of infringement altogether in the interests of efficiency and brevity.

Patent infringement does indeed follow the latter pattern. The ways in which potential infringers may effectively copy a patented idea are both heterogeneous and infinite in variety. The patent system is all about inventive new ideas, and this applies with no less force to new ways of using another's original idea than to inventing original ideas in the first place. And again, most patent infringement is inadvertent and merely the side effect of good faith efforts by fellow inventors to develop their own original ideas, often in an industry-wide push in the same direction as the patented idea.[246] The resulting infringement is frequently the same inventive idea but with the infringer's own creative slant.

As a result, patent claims suffer the same incompleteness as any other rule in the same situation. For example, could NTP have anticipated in 1991 that, less than twenty years later, email users would be downloading and

244. Doug Lichtman, *Substitutes for the Doctrine of Equivalents: A Response to Meurer and Nard*, 93 GEO. L.J. 2013, 2026 (2005).

245. Burk & Lemley, *supra* note 7, at 1781–82; *see also* Kaplow, *supra* note 203, at 309; Kaplow, *supra* note 76, at 563.

246. *See supra* text accompanying notes 196–198.

sending their messages wirelessly, using multipurpose devices like laptops, tablets, and smartphones to do so? Probably not. And yet according to NTP, all of these technologies infringe the inventive idea for which it first filed back in 1991 for patent protection.[247] True, some of these separately developed variations on patented ideas may be so unique and inventive as to be separately patentable themselves, but as long as they overlap with the earlier patented idea, they could very well infringe on the original inventor's idea.[248]

While it is incumbent upon patent drafters to try to anticipate as many of these overlapping variations as possible, their ability to do so is limited. Just as the costs of describing every possible embodiment of an inventive idea are impossibly high, so too are the costs of describing every possible variation. NTP could no more have described every single conceptual variation on its wireless email concept, such as RIM's BlackBerry or even AT&T's and Motorola's subsequently developed smartphone systems, than it could have described each possible way of physically embodying such systems.[249] Claim drafters cannot be expected to describe physical embodiments or conceptual variations that were unforeseeable and perhaps not even possible at the time of drafting, just as they cannot be expected to anticipate the emergence of unknown prior art, future changes in language, or other unforeseeable contingencies.

Rather, those who draft rules such as patent claims will most efficiently invest in both clarifying meaning and anticipating contingencies only when it provides a benefit in guiding courts and other parties in interpreting and understanding those rules.[250] Where a risk of infringement is exceptionally high, parties will find it worthwhile to invest more in clarifying ambiguities and anticipating such risks. Where a risk of infringement is lower, drafting parties may rationally forgo the costs of clarification and save particularly challenging or unforeseen risks for resolution *ex post*. Further investments in clarity and completeness would yield decreasing marginal returns. This is particularly true when the probability of a particular contingent risk is low

247. Rob Pegoraro, *Faster Forward: NTP Sues Everybody over Alleged Wireless E-Mail Patents*, WASH. POST (July 9, 2010, 3:29 PM), http://voices.washingtonpost.com/fasterforward/2010/07/ntp_sues_world_over_wireless_e.html.

248. In order to be found infringing, the variation must contain all the same "elements" or components as, and so must overlap completely with, the claimed invention. The infringing invention need not be identical to the claimed invention, however, and may have additional elements that are themselves separately patentable. RIM's patented technology was infringing because it overlapped with NTP's patents. *See supra* text accompanying notes 124–128.

249. NTP later filed suit against AT&T and Motorola for allegedly infringing many of the same patents at issue in the suit with RIM. NTP, Inc. v. AT&T Mobility, LLC, No. 3:2007cv00550 (E.D. Va. Sep. 7, 2007), *available at* http://dockets.justia.com/docket/virginia/vaedce/3:2007cv00550/221676; NTP, Inc. v. Motorola, Inc., No. 3:2010cv00471 (E.D. Va. July 8, 2010), *available at* http://dockets.justia.com/docket/virginia/vaedce/3:2010cv00471/255651.

250. Schwartz & Scott, *supra* note 230, at 545; Posner, *supra* note 230, at 544.

relative to the costs of providing for it. The less likely a particular contingency, the less valuable investments are in providing for it.[251] We can expect rational parties to invest in drafting for the most probable or important contingencies first, then the second most probable or important, and so on, until the marginal cost of drafting for an additional contingency exceeds the expected marginal returns.[252] The resulting rules may be efficient yet incomplete and ambiguous.

Another problem in drafting airtight patent claims is that even the most carefully drafted rules are prone to opportunism. As rules, patent claims limit themselves only to what they specify, but those specifications are only imperfect proxies for effecting the underlying purpose of the rule.[253] Patent claims thus effectively state up front not only what they do cover but also what they do not cover.[254] Even though a patentee may have rationally and efficiently decided not to invest in drafting against all forms of infringement, it is exactly these forms that potential infringers will seek out if they want to escape liability for free riding on the patent.[255] Under such circumstances, the probability of any given form of infringement may be *de minimis*, but the sum total odds of some type of infringement can approach infinity, particularly if the underlying inventive concept is valuable. The costs of drafting against all such contingencies are clearly prohibitive.[256]

In this way patent claims, like tax codes, are particularly subject to opportunistic exploitation of ambiguities to avoid liability.[257] A taxpayer will use loopholes to avoid paying taxes, and the patent infringer will use loopholes to free ride on the patent, to avoid infringement liability, or to try to invalidate the patent. In fact, inventors should expect that potential infringers, or at least their legal counsel, will affirmatively look for such loopholes.[258] While the patent drafter has to anticipate and try to cover all

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251. Scott & Triantis, *supra* note 66, at 819; Posner, *supra* note 30, at 1584, 1610.

252. Meurer & Nard, *supra* note 90, at 1952; *see also* Kaplow, *supra* note 76, at 563 ("Designing a rule that accounts for every relevant contingency would be wasteful, as most would never arise."); Posner, *supra* note 230, at 544.

253. Isaac Ehrlich & Richard A. Posner, *An Economic Analysis of Legal Rulemaking*, 3 J. LEGAL STUD. 257, 258 (1974); Kaplow, *supra* note 76, at 565; *cf.* Autogiro Co. of Am. v. United States, 384 F.2d 391, 397 (Ct. Cl. 1967) ("An invention exists most importantly as a tangible structure or a series of drawings. A verbal portrayal is usually an afterthought written to satisfy the requirements of patent law. This conversion of machine to words allows for unintended idea gaps which cannot be satisfactorily filled.").

254. Rose, *supra* note 221, at 592.

255. Newman, *supra* note 12, at 80–81.

256. Fromer, *supra* note 24, at 757 (noting that while patentees must anticipate all loopholes, competitors need to find only one loophole to escape liability); Meurer & Nard, *supra* note 90, at 1998; *cf.* Posner, *supra* note 30, at 1602 ("[W]hile the probability of a particular contingency materializing may be slight; the probability that some contingency in what may be a very extensive array of low-probability events will materialize may be great.").

257. RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 95–98 (6th ed. 2003); Rose, *supra* note 221, at 592, 596–99.

258. Rose, *supra* note 221, at 592.

possible embodiments of, variations on, and risks of invalidation of their inventive ideas, potential infringers have to find only one loophole to circumvent all of the drafter's precautions.[259] The owner of a valuable patent therefore cannot rely on being protected against all comers, creating uncertainty as to the patent's value.

In this way, patents again differ starkly from real property. Real property rights, of course, also suffer from the uncertainty of unforeseen events.[260] Real property rights may be affected by unexpected zoning changes, environmental issues, nuisances, and even servitudes. But all of these tend to be less frequent and less surprising than unforeseen contingencies relating to patented inventions, largely because of the relatively static nature of real property.[261] Moreover, real property regimes typically employ a variety of measures to protect against such unexpected events, such as zoning laws and variances, limitations on cognizable servitudes, the *sic utere* doctrine, and other quiet enjoyment doctrines.[262] Patented inventive concepts, by contrast, enjoy no such protections.

Unlike patented ideas, which are often feared as monopolistic exceptions to what would ideally be a free exchange of ideas, quiet enjoyment of real property is viewed as a basic right of ownership. Whereas interferences with quiet enjoyment of real property are seen as nuisances or trespasses, in patent law they are seen as competition to be encouraged except in cases of infringement. This distinction is consistent with the overarching differences in the purposes of the patent system and real property regimes. While real property rights are upheld as fundamental to personhood as well as a free-market economy, patent rights are considered an "embarrassment" to competition.[263] Patent drafters are left to their own hard luck if they fail to protect their inventive ideas from interference by others.

That is not to say that patentees have no protective measures in their arsenal. Functional and conceptual claiming, for example, can be useful in addressing exactly these kinds of contingencies. Describing an inventive idea by its conceptual and functional relationships rather than by its physical characteristics allows claim drafters to explain in real terms why unknown future technology might infringe on the patented idea. By expressly setting forth those defining characteristics, patent claim drafters can protect themselves to some extent against changes in technology or terminology not necessarily relevant to their inventive idea or how others might infringe the patent. Functional and conceptual claiming in many ways increases the clarity of patent boundaries because it hones in on what constitutes

259. Burk & Lemley, *supra* note 7, at 1752–53; Meurer & Nard, *supra* note 90, at 1975 (*cited in* Fromer, *supra* note 24, at 757).

260. Lemley & Shapiro, *supra* note 152, at 76.

261. Duffy, *supra* note 12, at 1085.

262. Newman, *supra* note 12, at 106–07.

263. Carter, *supra* note 140, at 716–18.

infringement of a patent rather than merely approximating it by describing embodiments. As explained above, however, conceptual characteristics are still unavoidably abstract and cannot be easily observed or measured, creating uncertainty.[264] And drafters must still use language to describe even the most functional and conceptual of characteristics, leaving them and their patents subject to the inconstancy of language as technology and usage evolve over time.

In fact, a number of critics charge that patentees intentionally draft not just abstract but strategically vague claims in the hopes that they can parlay that ambiguity into greater patent scope later should the claims need to be construed in the course of litigation.[265] This is undoubtedly true for some small number of patent claim drafters, for the greater a patent's scope, the more valuable the patent may become. But the larger truth is that much "vague" claim language is not strategic gaming but rather, for all the reasons explained above, simply the patentee's good faith effort to protect her inventive ideas against an uncertain future.[266] A patentee's best interests lie in avoiding such uncertainty, which hinders licensing and investment decisions and otherwise throws the value of patents into doubt.

Patentees have other reasons to avoid uncertainty, primarily due to the risk of invalidity. The Patent Act requires that patents, in an adequately detailed and "definite" manner, fully enable the PHOSITA to make and use the claimed invention. Patent claims that fail to meet either requirement are considered invalid.[267] Claims that may be interpreted too broadly are also at much greater risk of running afoul of invalidating prior art references. Patentees need to differentiate their claimed inventions from known technologies in their art, and this often relies on carefully and precisely drawn lines between the invention's novel contribution to the art and what existed before. If those lines are too vague, a patentee's claim language could be rejected by the PTO or, worse, invalidated by a court. In fact, patentees are believed to draft their claims more narrowly due to fears of unknown but invalidating prior art references.[268] Often, these prior art references appear only when a highly motivated defendant digs up the references as part of its defense to alleged infringement,[269] and the validity of a claim or entire patent in light of those references could easily depend on how the patent's claims are construed.

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264. *See, e.g.*, *supra* text accompanying notes 100, 114, 174.

265. BESSEN & MEURER, *supra* note 10, at 56–58, 235–53.

266. *See, e.g.*, Letter from Michael K. Kirk, Exec. Dir., American Intellectual Property Law Association, to The Honorable Robert W. Bahr, Senior Patent Attorney, Office of the Deputy Commissioner for Patent Examination Policy (Apr. 24, 2006), *available at* http://patentlaw.typepad.com/patent/aiplarules.pdf (*cited in* BESSEN & MEURER, *supra* note 10, at 220).

267. Burk & Lemley, *supra* note 125, at 1593.

268. Kieff, *supra* note 47, at 101, 104.

269. Kesan & Banik, *supra* note 53, at 25; Lemley & Shapiro, *supra* note 152, at 76, 80.

Much like the use of functional and conceptual claiming to protect against facile infringement, however, patentees can hedge against both infringement and the risk of invalidity through multiple-claim drafting techniques. Multiple-claim drafting allows patentees to cover their inventive ideas through pyramidally organized independent and dependent claims of varying breadth.[270] As a result, if and when a broader version of a claim on an inventive idea is invalidated, patentees will at least still retain rights over the remaining narrower versions.[271] Sacrificing patent scope by narrowing one's claims further reduces the chances that a patentee will inadvertently, and invalidly, draft claims that cover prior art.[272] Even the most strategic form of multiple claiming will not provide complete insurance against unknown but invalidating prior art, though. Risk-averse patentees will therefore tend to draft their patent claims conservatively.

Although most patentees may not intentionally draft ambiguous patent claims, the abstraction and novelty of inventive ideas, combined with the unforeseeability of the future, mean that patent claims will inevitably be both incomplete and uncertain. When the potential forms of trespass vary greatly, particularly over time, devising a rule *ex ante* to govern those activities will be not only costly but also inefficient. Patentees and other rule-drafters in similar circumstances may rationally rely on courts to resolve unaddressed contingencies *ex post*.[273] In fact, for many such rule-drafters, postponing resolution of many issues can be beneficial because the necessary information will not become available until later.

This is particularly true for patent claims. The nature of technological progress is such that circumstances will change rapidly over time, particularly if the invention at issue is pioneering.[274] The other technologies potentially infringing patent claims are often so heterogeneous that vital information about those activities may be more efficiently collected *post hoc*. And the necessary information about those other technologies typically will lie in the hands of alleged infringers, who will make it available only when ordered by a court. Many commentators consider relying on *ex post* resolution to be more efficient on many issues, including validity, because those issues are too information-intensive to resolve efficiently at the drafting and examination stage.[275]

Postponing certain issues until later makes drafting parties more dependent on courts, however, and it subjects them to the court's potential errors in resolving an issue.[276] And while patentees may efficiently postpone complete

270. Fromer, *supra* note 24, at 758 (and citations therein).

271. Meurer & Nard, *supra* note 90, at 1975; *see also* 35 U.S.C. § 112, ¶ 3 (2006) (allowing multiple dependent claiming).

272. Kieff, *supra* note 47, at 101, 104.

273. Rose, *supra* note 221, at 600.

274. Long, *supra* note 24, at 512–13.

275. Kieff, *supra* note 47, at 73.

276. Posner, *supra* note 30, at 1583–84, 1588; Scott & Triantis, *supra* note 66, at 820.

resolution of patent scope until litigation, the courts charged with determining patent scope under such circumstances face their own cost-benefit analyses in struggling to achieve optimal outcomes. Most importantly, courts must figure out how to deal with the unaddressed contingencies in patent claims and with the inevitable incompleteness they create.

The case law illustrates how the courts have struggled mightily with patent claim construction but have yet to devise a unified body of construction canons that yield consistent results. Given the inherently uncertain nature of patent claims, one can hardly blame the courts for being unable to interpret them with certainty. Some of the obstacles to predictable patent claim interpretation are simply unavoidable; the esoteric nature of the technologies claimed and the inherent limitations of language both hinder non-specialist courts in their efforts to interpret patent claims.[277]

Analyzing patent claims through a claims-as-rules framework provides some insight on uncertainty in patent claim construction. Courts' difficulties with claim construction may stem, in part, from their failure to appreciate how patent claims deviate from the ideal rule. The resulting confusion has produced a mishmash of interpretive approaches that seem to ignore the shortcomings of patent claims as rules and create their own brand of uncertainty.

To understand this problem, one need only look at the modern canons of claim construction.[278] The federal district courts are given the discretion to construe patent claims in a mini-hearing called a Markman hearing.[279] Courts may hold a Markman hearing at any point in the trial that they see fit, even if that point occurs before discovery has been conducted.[280] The wording of the claim should then be given its "plain and ordinary meaning" as understood by a PHOSITA, unless something in the patent demonstrates that the patentee intended to assign some other, more specialized meaning to a particular term.[281]

Under this approach, judges would simply have to familiarize themselves with the relevant technology and terminology in order to be led to the "correct" interpretation of patent claims. If patent claims were clear on their face like ideal rules, this procedure would be fairly straightforward. But patent claims are seldom clear, especially by the time the meaning of a patent claim is being litigated. Construing claims through techniques better suited for bright-line rules therefore just causes more problems.

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277. Fromer, *supra* note 24, at 758; *see also* Kaplow, *supra* note 76, at 562–63; Schwartz, *supra* note 13, at 259.

278. *See, e.g.*, Burk & Lemley, *supra* note 7, at 1753–61.

279. Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996); Moore, *supra* note 14, at 7–8.

280. Burk & Lemley, *supra* note 7, at 1759; Cotropia, *supra* note 47, at 71; Moore, *supra* note 14, at 28.

281. Burk & Lemley, *supra* note 5, at 33; Moore, *supra* note 14, at 28.

For example, construing patent claims during a Markman hearing before the presentation of evidence or even compulsion of discovery deprives the court of information necessary to understand the claims. In fact, patent claim construction is often so information-intensive that courts have been known to modify their initial interpretations in light of new information presented later at trial.[282] Likewise, interpreting patent claims through the eyes of the relevant PHOSITA is a great idea on its face, but the PHOSITA is an uncertain lodestar itself. From what time period should a court draw its PHOSITA? What specialized knowledge can we expect the PHOSITA to have? And what would a PHOSITA understand a claim to mean if it describes an inventive idea that is novel and therefore never seen or even imagined by any PHOSITA? All of these are highly context-dependent questions that defy easy answers.[283]

Perhaps the most rule-oriented of the construction canons is the requirement that claims be interpreted according to their "plain and ordinary" meaning. Does the word "computer" have a plain and ordinary meaning? Do any words, including simple ones like "a," "or," "to," "on," "about," "including," and "through"?[284] Or are they all context-dependent, such that they may vary in definition not only according to how they are used in a claim but also at what point in time the claim is being construed? For purposes of determining infringement, a claim's meaning is interpreted as of the time of the alleged infringement, which will vary from accused infringer to accused infringer.[285] To suggest that a claim term might possess a permanent "plain and ordinary" meaning flies in the face of how language is actually used and understood. Not surprisingly, under such confusing guidance, the trial courts and the Federal Circuit have developed a multitude of differing, often conflicting approaches to interpretation.[286]

Perhaps the greatest drawback to treating patent claims purely as rules is that such treatment risks losing sight of the purpose of patent claims. Patent claims, like all rules, are often limited in their ability to effect the underlying purpose of the rule when they are unable to address all the contingencies to which they will be applied. Rules are inevitably incomplete in such situations.[287] This is why some ingenious taxpayers continue to find loopholes in the tax codes and why other hapless individuals are held liable

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282. Jeffrey A. Lefstin, *Claim Construction, Appeal, and the Predictability of Interpretive Regimes*, 61 U. MIAMI L. REV. 1033, 1055–56 (2007) (and sources cited therein).

283. *See generally* Burk & Lemley, *supra* note 7, at 1755; Golden, *supra* note 14, *passim*.

284. Burk & Lemley, *supra* note 5, at 53.

285. Lemley, *supra* note 7, at 109–10.

286. *See generally* R. Polk Wagner & Lee Petherbridge, *Is the Federal Circuit Succeeding? An Empirical Assessment of Judicial Performance*, 152 U. PA. L. REV. 1105 (2004) (examining the Federal Circuit's differing interpretive approaches); Miller, *supra* note 155, at 182 (noting increasing rates of dissents on claim construction).

287. Rose, *supra* note 221, at 592.

in situations where a sense of fairness or efficiency might dictate otherwise. Both false-negative and false-positive types of mismatch blunt the ability of rules to incentivize desirable behavior and deter undesirable behavior.[288] Applying rules as if they were optimal manages to be both under- and over-inclusive.

The unpredictability of the future in technological and scientific fields, changes in language over time, and even the difficulty of describing technological concepts through the written word all suggest that courts should interpret patent claims as both rules and standards. In fact, a few commentators suggest that we should abandon the peripheral patent claiming system altogether and instead invest in a more standard-like claiming approach as a way to improve the efficiency and fairness of the patent system.[289] But how can courts justify such treatment? The more standard-like central claiming system has long since been rejected as creating too much uncertainty, particularly within the patents-as-property paradigm of patent claiming.[290] Even if we view patent claims as both rules of exclusion and rules of governance, that is not the same as saying that patent claims should be interpreted as standards rather than rules. Rules of governance do have much in common with standards, for governance rules often allow for the same balancing of interests and context-dependence. Even so, they are still rules.[291]

Nonetheless, the courts' overall approach to interpreting patent claims appears to be consistent with the view that patent claims are not only rules of governance but also incomplete rules. If nothing else, the various possible canons of construction that the courts have *not* adopted are instructive. If certainty in patent claim meaning were truly the primary goal of modern patent claim construction, there are a number of bright-line techniques that the courts could employ. The courts could simply place the burden of uncertainty on one party or the other through interpretive approaches such as the doctrine of *contra proferentem*.[292] Under this doctrine, patentees would bear all responsibility for the fact that their claims are not complete, and any unaddressed contingencies would automatically be ceded to potential infringers as liability-free loopholes. This principle would provide both courts and potential infringers with greater certainty at the expense of the patentee: if something is not clearly in the patent claim, it does not belong to

288. *Id.* at 596–601.

289. *See generally* Burk & Lemley, *supra* note 7 (discussing the costs and benefits of returning to a more central-claiming-like approach to patenting); Fromer, *supra* note 24 (advocating central claiming and claiming by exemplar in patent law); *see also* Jonathan L. Moore, *A Patent Panacea? The Promise of Corbinized Claim Construction*, 9 CHI.-KENT J. INTELL. PROP. 1 (2009) (advocating more subjective approaches to claim construction).

290. Burk & Lemley, *supra* note 7, at 1745; Fromer, *supra* note 24, at 731–35.

291. *Cf.* Smith, *supra* note 12, at 1744–46, 1784–85 (noting the characteristics of governance rules).

292. Golden, *supra* note 14, at 324 n.14.

the patentee.[293] Alternatively, patent courts had previously construed claims to avoid invalidating the original patent and thereby undermining the patentee's expectations. This tends to favor the patentee over the alleged infringer.[294] Modern courts have been reluctant to employ either interpretive approach, however, opting instead to spotlight other goals such as equity.[295]

The case law on patent claim construction suggests that the courts understand the shortcomings of treating patent claims purely as rules. The courts have therefore adopted interpretive canons that treat patent claims less like pure rules and more like mixtures of rules and standards. A simple standard may more efficiently provide the necessary flexibility to address unpredictable events without sacrificing the predictability that could not have been achieved in such circumstances anyway.[296] A standard may also be better suited because the events themselves may provide the information necessary to determine culpability.[297]

These latter, more standard-like canons thus may address many of the inherent uncertainties in patent claiming in a way more commensurate with the purposes of the patent system and with equity.[298] Such equitable concerns are palpable, if not necessarily expressed, in other ways that courts construe patent claims. On the one hand, burdening subsequent inventors with liability for infringing another's patent even though they created utility of their own is often unfair and perhaps not in the best interests of society. On the other hand, failing to protect patentees against significant incursions is inequitable and may discourage innovation. And because patenting an invention may hinder further improvements and competition (in the form of copying), the law relies on all the patentability criteria to prevent patents that may harm not only subsequent technological progress but also competition within the market.[299]

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293. Bradley D. Liggett, Contra Applicantem *or* Contra Proferentem Applicatio*: The Need for Clarification of the Doctrine of* Contra Proferentem *in the Context of Insured-Created Ambiguities in Insurance Applications*, 2008 BYU L. REV. 211, 214 n.11 (and sources cited therein); Cameron W. Ellis, *Toward a Nuanced Plain Language Approach in Federal Contract Interpretation: What Do* Bell BCI, States Roofing, *and* Lai Services *Imply?*, 39 PUB. CONT. L.J. 821, 827–28 (2010); *cf.* Rose, *supra* note 221, at 592 (noting that emphasis on certainty *ex ante* often means penalizing the drafter).

294. Molly Silfen, *Claim Interpretation Recommendations for the Federal Circuit Court of Appeals in* Phillips v. AWH, 14 U. BALT. INTELL. PROP. L.J. 47, 73 (2005).

295. *See, e.g.*, Phillips v. AWH Corp., 415 F.3d 1303, 1327–28 (Fed. Cir. 2005) (en banc); *see also* Golden, *supra* note 14, at 324 n.14; Peter S. Menell, Matthew D. Powers & Steven C. Carlson, *Patent Claim Construction: A Modern Synthesis and Structured Framework*, 25 BERKELEY TECH. L.J. 711, 765 (2010); Silfen, *supra* note 294, at 74.

296. Ehrlich & Posner, *supra* note 253, at 273–74 (noting that drafting costs increase even more when rules have to be modified to meet changes over time).

297. *See supra* text accompanying notes 274–276; *see also* Kaplow, *supra* note 76, at 562–63.

298. *See, e.g.*, *Phillips*, 415 F.3d at 1327–28; *see also* Golden, *supra* note 14, at 324 n.14; Menell, Powers & Carlson, *supra* note 295, at 765; Silfen, *supra* note 294, at 74.

299. Barton, *supra* note 53, at 456–57; Kesan & Banik, *supra* note 53, at 29.

According to the courts, none of these rationales is a legitimate reason to interpret any particular claim in any particular way every time. But they are compelling concerns that may nonetheless influence a court's choice to emphasize one interpretive approach in one case while emphasizing a different approach in another case. For example, commentators have noted that the courts will change the meaning of defined patent law terms such as "means," "consisting of," or "comprising," if the results would otherwise be absurd.[300] The judiciary's awareness of the difficulties of drafting airtight patent claims is yet another reason that patent claim meaning is often uncertain.[301]

Equitable concerns also expressly influence the way courts interpret patent claims. In particular, courts sometimes choose to compensate for unforeseen contingencies by interpreting patent claims as standards rather than rules.[302] Laws usually do not exist in clear rule or standard format and instead exhibit characteristics of both.[303] Courts in infringement cases may therefore resort to the "doctrine of equivalents," a standard that allows courts to find infringement even when the accused technology does not lie within the literal scope of a patent claim but nevertheless is the "equivalent" of the claimed invention in the way that it functions, the means it uses, and the results it yields.[304] Even though patentees may not have invested the foresight (or the clairvoyance, in the case of equivalent technologies not even invented until after the patent was drafted) to claim expressly all equivalents of their patented innovations, they can still enjoy protection against such infringement with the assistance of the courts.

Many commentators and jurists have complained that the doctrine of equivalents injects too much uncertainty into patent claim scope,[305] but perhaps such uncertainty is somewhat beneficial. By discouraging exploitation of loopholes in patent claims, the doctrine of equivalents may deter opportunism in a way that ultimately increases overall social welfare.[306] Similarly, the means-plus-function format allowed under section 112, paragraph 6 of the Patent Act allows patentees to describe an element of their inventive idea by its function rather than its structure and, later, to claim patent scope over anything structurally equivalent to examples of that element.[307] Equivalence through means-plus-function claiming is more limited than equivalence under the doctrine of equivalents, but both serve similar purposes in allowing courts

300. Burk & Lemley, *supra* note 7, at 1793–94.
301. Landry, *supra* note 84, at 92–93.
302. Johnston, *supra* note 9, at 364.
303. Rose, *supra* note 221, at 593.
304. Burk & Lemley, *supra* note 7, at 1772; *see also* Smith, *supra* note 12, at 1807.
305. *See, e.g.*, BESSEN & MEURER, *supra* note 10, at 61–62; Meurer & Nard, *supra* note 90, *passim*.
306. Rose, *supra* note 221, at 600.
307. Lemley, *supra* note 7, at 107–08; Meurer & Nard, *supra* note 90, at 1975.

more equitable discretion in how they interpret and apply patent claims.[308] In particular, both means-plus-function claiming and the doctrine of equivalents treat patent claims more like standards and less like pure rules, an approach more in keeping with the various differences between patent claims and ideal rules.

CONCLUSION

While desirable, certainty in patent claims and other rules comes at a cost and may be impossible to achieve.[309] Patent claims by their nature will inevitably be more uncertain in their "boundaries" than real property boundaries. As such, it seems odd that so many critics state that the patent system is necessarily failing simply because patent boundaries are less certain than real property boundaries.

There are too many differences between the patent system and real property regimes to equate the two legal systems. Indeed, patents might better be described as rules of governance that define the contours of desirable and undesirable behavior instead of the metes and bounds of a property *res*. In the end, patent claims are undoubtedly a little of both, however: property boundaries in that they define near-absolute rights of exclusion over an inventive idea, but rules of governance in that they affect others' rights to use that inventive idea. And regardless of how we characterize patent claims, we must be cognizant of why they are inevitably uncertain in their meaning and boundaries. The conceptual and unavoidably abstract nature of patent claims, the desired novelty of the patent *res*, and the unpredictability of future technology all mean that patent claims can never neatly establish expectations *ex ante* the way an ideal rule might.

Instead, patents are best interpreted as a combination of rules and standards, designed for public notice but limited by equitable concerns that hinder the clarity of that notice. This has implications for how courts should interpret patent claims. Interpretive methods that simply assume that patent claims are rules will run into problems and even create uncertainty themselves. Interpretive methods that are designed for blends between rules and standards, on the other hand, could be a suitable fit for patent claims. Approaches such as means-plus-function claiming and the doctrine of equivalents may therefore be much more useful than currently appreciated.

The analysis here is by no means an argument that our current patent system is perfect or even that it is working well. Many legitimate complaints can be and have been made about the patent system, including complaints

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308. Intellectual Sci. & Tech. Inc. v. Sony Elecs., Inc., 589 F.3d 1179, 1183 (Fed. Cir. 2009).

309. Hadfield, *supra* note 9, at 546; Jason S. Johnston, *Bayesian Fact-Finding and Efficiency: Toward an Economic Theory of Liability Under Uncertainty*, 61 S. CAL. L. REV. 137 *passim* (1987).

about patents granted on obvious or already well-known technology, or about patents used to hold up important social welfare advances such as breast cancer detection and treatment.[310] Nor is this Article intended to be a conclusive analysis of the patent system. Without specifically addressing any particular industry affected by patent law and without further empirical support, the conclusions offered are necessarily preliminary and tentative. The analysis here argues only that any particular focus on patent claims and claim construction as a way to improve the overall function of the patent system must look beyond the real property analogy and take into account the particular features of the patent system.

310. JAFFE & LERNER, *supra* note 13, *passim*.