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Plumb Lines Instead of a Wrecking Ball: A Model for Recalibrating Patent Scope

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SYMPOSIUM
JAMES BESSEN AND MICHAEL J. MEURER’S
PATENT FAILURE: HOW JUDGES, BUREAUCRATS,
AND LAWYERS PUT INNOVATORS AT RISK

PLUMB LINES INSTEAD OF A WRECKING BALL:
A MODEL FOR RECALIBRATING PATENT SCOPE

F. Russell Denton*

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I. INHERENT FUZZINESS IN PROPERTY LINES

There is more to property lines than meets the eye, and their complexities are ever evolving. An underwater real estate rush extends 350 miles out from ocean shorelines and includes oil and mineral rights beneath the ocean floor according to the U.N. Law of the Sea Convention.1 Russia planted its flag on the ocean bottom at the North Pole to controversially claim territory there,2 and the United States is mapping arctic geologic features in anticipation of making claims.3 Due to difficulties in deep sea mapping, technical resolution of conflicting claims will likely take years, if not decades. The politics may take longer. In an older but more complex problem in the United States, the state of Georgia is seeking water rights on the Tennessee River, renewing longstanding claims that its border with Tennessee was wrongly surveyed in 1818 and extends a mile further north to the thirty-fifth parallel under Congress’s original instructions.4 Georgia has also disputed limits on riparian water rights with Florida and Alabama for decades despite tri-state water compacts.5

5 The “tri-state water wars” dispute involves the apportionment of water between Georgia lakes such as Lanier (a reservoir for Atlanta) and downstream rivers (the Chattahoochee hosts freshwater species in coastal regions of the other states). The Alabama-Coosa-Tallapoosa Compact, O.C.G.A. § 12-10-110 (2008), and Apalachicola-Chattahoochee-Flint River Basin Compact, Pub. L. No. 105-104, 111 Stat. 2219 (1997), were to settle disputes outside the U.S. Supreme Court. See, e.g., Peter A. Appel, Water Wars — Will Georgia, Alabama and Florida Ever Agree?, ADVOCATE 10 (Spring/Summer 2007), available at http://www.law.uga.edu/news/advocate/spring2007/waterwars.pdf (discussing the legal and political history of the tri-state water wars). The dispute goes on: recent Georgia lake waterlines are fifteen vertical feet below historic averages due to drought, but the dams’ manager (Army Corps of Engineers) maintains aggressive water release policies. See Stacy Shelton, Georgia’s Water Crisis: Wasteful Habits Wither in Drought, ATLANTA J.-CONST., Apr. 6, 2008, available at http://www.sjc.com/metro/content/printedition/2008/04/06/drought0406.html (noting
Yet, land and water have no monopoly on fuzzy ownership boundaries. Many other perplexing boundary controversies may also be found beyond prima facie obvious property rights. A sampling includes found property, inherited assets, archaeological tribal relics, access to clean air or direct sun, radio frequency use, and domains of outer space.\(^6\)

Such murkiness could not satisfy the crisp standards by which Bessen and Meurer measure whether something truly works as property in their new book, \textit{Patent Failure}.\(^7\) Under their primary theory, “if you can’t tell the boundaries, it ain’t property,” i.e., a failure to notice or recognize boundaries is evidence of failure in

\(^6\)Examples of controversies over ambiguous boundaries for property rights include the following: Bridges v. Hawkesworth, 21 L.J.R. 75 (Q.B. 1851) (holding that lost property goes to the finder rather than the owner of the premises); McAvoy v. Medina, 93 Mass. (11 Allen) 548 (1866) (holding that the finder takes nothing and mislaid property belongs to the owner of the premises until the true owner claims it, though the distinction between lost and mislaid requires a court to know something about the one who lost the item); Hatch v. Riggs Nat’l Bank, 361 F.2d 559 (D.C. Cir. 1966) (holding that Doctrine of Worthier Title inheritance raises a presumption that no remainder is granted, but the presumption is rebuttable by evidence of a contrary intent of the grantor); Whitacre v. State, 619 N.E.2d 605 (Ind. Ct. App. 1993), aff’d, 629 N.E.2d 1236 (Ind. 1994) (holding that a man who wished to dig for Native American artifacts was required to obtain a state permit under Indiana’s Historic Preservation and Archeology Act though the dig was on his own property); Connecticut v. Am. Elec. Power Co., 406 F. Supp. 2d 26 (S.D.N.Y. 2005) (holding that the question of whether carbon emissions in air constitutes a nuisance involves non-justiciable political questions that are consigned to the political branches, not the judiciary); Comer v. Murphy Oil, USA, Inc., No. 1:05-cv-436 (S.D. Miss. Aug. 30, 2007), appeal docketed, No. 07-60756 (5th Cir. 2007) (holding that blocking sunlight was not a nuisance); Prah v. Maretti, 321 N.W.2d 182 (Wis. 1982) (holding that there is a cause of action from blocking sunlight); FCC v. Nextwave Pers. Communications, Inc., 537 U.S. 293 (2003) (holding that use licenses for federal radio frequency properties are like other property licenses and thus are governed by bankruptcy law); Wayne N. White, Jr., \textit{Real Property Rights in Outer Space}, PROCEEDINGS, 40TH COLLOQUIUM ON THE LAW OF OUTER SPACE 370 (IISL 1998), available at http://www.spacefuture.com/archive/real_property_rights_in OUTER_SPACE.shtml (“The 1967 Outer Space Treaty prohibits states from establishing territorial sovereignty, but authorizes and, in some cases even requires, that states exercise jurisdiction over space objects and personnel . . . The 1967 Outer Space Treaty [1] does not provide a positive regime for the governance of space development. The 1979 Moon Treaty [2] provides a regime for development, but that regime prohibits real property rights. For that and other reasons, most nations have not signed or ratified the Moon Treaty.”).

\(^7\)JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK (2008).
public policy and legal instruments. Thus their standard for certainty in intellectual property exceeds what is practical even for many venerable types of tangible property, and their call to disqualify many patents as property seems to be misdirected, or at least needs a more technically correct basis.

Nevertheless I believe Bessen and Meurer make an important policy contribution to patent law reform both by drawing attention to the problem of inadvertent infringers and in consolidating a prodigious amount of economic data on patents. Infringement is, of course, like trespass, with strict liability in most cases. Even when a patent right is obscure and an infringer tried in advance to avoid infringement, her mental state is not relevant and the law holds her liable. Yet, in this situation, society has an interest in reducing liability costs. Consequently, the authors focus on parties blind-sided by infringement suits.

Though Bessen and Meurer confined their analysis to the needs of inadvertent infringers, I would broaden the scope to include first inventors’ needs because infringement penalties are important for protection from unfair trade practices. Finding effective ways to minimize infringement costs simultaneously for both the original and the later independent inventor is a more challenging, yet promising, goal than reducing costs for either in isolation. Any politically expedient solution must accommodate both types of inventors. Moreover, one-sided reforms have unintended consequences.

In this Article, I introduce a trio of plumb lines for reforming the notice function, at a low cost to original inventors and the patent office, to minimize inadvertent infringement by diligent parties acting in good faith. My model aligns the scope of enforceability with United States Patent and Trademark Office (PTO) examiners’ perceptions of inventions, as gauged by existing art classifications. It also aligns the scope of anticipation with inventor perceptions at the time of filing by requiring inventors to search and discuss nearest known art; this strengthens estoppel prospects for claim scope. My model aligns the

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8 Id. at 8.
9 See BESSEN & MEURER, supra note 7, at 46–72 (arguing that inadvertent infringement arises in many cases due to vagueness and ambiguity in patent claims, hiding of claims in continuation patents, and/or the large number of patents that must be searched).
11 See Robert K. Merton, The Unanticipated Consequences of Purposive Social Action, 1 AM. SOCIOl. REV. 894 (1936) (introducing the concept of the law of unforeseen consequences, also called the law of unforeseen consequences); California State University, Museum of unforeseen consequences, http://cs.calstatela.edu/wiki/index.php/Courses/CS_461/Museum_of_unintended_consequences (last visited Oct. 8, 2008) (providing a brief introduction and numerous examples of purposive actions that led to unforeseen consequences).
scope of obviousness with market (not just technical) consensus by articulating an inevitability criterion that fills gaps recognized by KSR rules. Then, to assess whether more extensive change is needed, I test the economic and jurisprudential assumptions that underly the urgency of Bessen and Meurer's arguments and the magnitude of their advocated reform. I find that contravening factors undermine their assumptions and require alternative interpretations of their data, justifying restraint in patent reform.

II. PLUMB LINE NO. 1: ALIGN ENFORCEABILITY WITH INVENTION CATEGORIES

I begin with the proposition that the issuing examiner's understanding of an invention during original prosecution is an objective basis for limiting the applicable patent's scope of enforcement. In part, the notice function is provided by cataloged categories of art that the examiner searched. These are unambiguous; the public is on notice of them because they are codified on the face of the patent. This also informs prosecution history estoppel because search classes can be contested during prosecution and supplemental filings may be made for claims under other art class categories.

This is an alternative to Bessen and Meurer's proposal to eliminate generic or abstract language, which I think is unworkable for the following reasons. Patent applicants walk a fine line between stating limits on their invention's scope under

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13 Arguably an applicant's privilege to influence classification decisions both at filing and during prosecution is implicit in the PTO's rules and procedures, even though it is not discussed much per se in PTO official documents. Under 37 C.F.R. § 1.76(b)(3) (2008), the Application Data Sheet (ADS), which is voluntary for both provisional and nonprovisional patent applications, includes sections in which the applicant may at her option suggest the classification class(es) and subclass(es), and technology unit for the assignment. See Form SB14 EFS-WEB (2007), available at http://www.uspto.gov/web/forms/index.html#startforms. Also, during the prosecution itself, the grounds for rebutting examiner rejections of claims are not expressly limited to those in which art search classifications must remain the same, thus the relevance of classifications is intrinsically at issue during prosecution. See, e.g., UNITED STATES PATENT AND TRADEMARK OFFICE, MANUAL OF PATENT EXAMINATION PROCEDURE § 2100 [hereinafter MPEP] (“Patentability” generally). For a particular example, see § 2141.01(a) (discussing the judicial rule that PTO classification is some evidence of analogy for purposes of rejection under 35 U.S.C. 103, but similarities and differences in structure and function carry more weight than the manner in which the invention was [originally] classified). Section 904 further provides for both updating of a search and further searches after the first action on the merits of an application. Thus, applicants already influence classifications and can challenge them at least to the extent that overcoming a rejection requires doing so. Expanding this right and making it statutory would put applicants into a position where their failure to challenge the scope of classification could be used to estop their enforcement outside that scope.
14 See BESSEN & MEURER, supra note 7, at pp. 56–62 (criticizing vague patent claim language).
the notice requirement and trying to draft claims that retain first-mover fair trade advantages by preempting copycats, improvers (whose patents may block key improvements of the original), and workaround technicians who might never develop the invention on their own otherwise. If the doctrine of equivalents provided much broader protection, then in theory drafting could be reduced to a description of one important embodiment of the invention because a broader umbra of embodiments would be implicit as equivalents, but United States patents are not interpreted by “central claiming.” The only viable alternative is abstraction—broad descriptions and not just particular examples—otherwise applicants would list every variation in concrete terms and excruciating, expensive detail, or file for many patents.

A classroom exercise illustrates the problem. Even my patent law students who have engineering backgrounds struggle when trying to draft clear, concise, inclusive, anticipatory but not overinclusive or underinclusive claims for something as simple as a pair of scissors. The blades are at certain relative orientations; their abutting surfaces slide in juxtaposition when cutting; and the rotation about a fused or freely moving pivot piece must be described. And that is for a device with only three moving parts (or just two if the pivot piece is fused to a blade, and just one if the pivot piece is flexible and fused to both blades). Thus, it was not hyperbole or polite deference when the Supreme Court described patent applications as “one of the most difficult legal instruments to draw with accuracy.”

Moreover, the blades can be straight, zigzagged (as in pinking shears), or another shape; may be coated with a lubricant or other chemical; may be spring-loaded and may be of any size; and the handles may have optional shapes. The pivot piece may straddle the scissors to connect only the outside faces of the blades. Also, scissors may be metal, plastic or ceramic; they may be pre-heated or pre-chilled for use; and their sliding surfaces may be planar, bent or curved. Blade sharpness may vary; blades must also be cinched neither too tightly nor too loosely; and cutting may be near the pivot point, the blades’ far end, or anywhere in between. Scissors may be customized to cut paper, cloth, films, plastic mesh,

15 The United States patent system has a “peripheral” claiming system. That is, claims mark the outer boundaries of the technology considered proprietary to the patentee. Ex parte Frescola, 27 U.S.P.Q.2d (BNA) 1608 (B.P.A.I. 1993). For a discussion of the earlier U.S. approach and the transition to peripheral claiming, see ROBERT C. KAHRL, PATENT CLAIM CONSTRUCTION 2-41 to 2-49 (2001).

16 See 37 C.F.R. § 1.16(s) (2008) (discouraging long applications by charging a $260.00 fee, or $130.00 for a small entity, for every fifty pages over one hundred per fee transmittal form PTO/SB/17).

rubber foams, metal sheets, hair, hedges, fingernails or other items. One blade may optionally be shorter, thicker, wider, or sharper than the other; one blade may be held stationary (as at a workbench clamp); the scissors may be configured for non-manual use (e.g., avoiding a robotics workaround); and so forth. So some scope may be prophetic. Only abstraction is efficient: “Two oppositely oriented cutting bodies held movably in close proximity to one another.”

Of course, patents cannot be obtained on the purest abstraction (scientific principle), and claims must be more peripheral than central. For instance, more than an invention’s essence must be claimed to satisfy the definiteness criteria. Nevertheless, analysis of an invention’s abstract central “essence” is alive and well because PTO search parameters are guided by the examiner’s central understanding of the invention instead of identifying and searching art from every classification at its periphery.

For that reason, instead of eliminating abstract language—which could be something as ordinary as “central processing unit (CPU),” a common term in software and computer patents—it would be more effective to simply ascertain what the examiner understood the invention to be. In principle, that was the basis for the grant anyway. Bessen and Meurer anticipate that logic and propose that the PTO should be authorized to provide opinion letters on infringement after issuance, which as described is reminiscent of reexamination for validity. At first blush this solution is attractive because it amplifies the technical expertise and databases for addressing the problem. Yet PTO opinion letters may be no improvement. The PTO imposes severe time constraints on all forms of examination, and, at least in private practice, opinion letters are very time consuming. Also, the PTO would not likely have the full slate of evidence before it renders an opinion on infringement, otherwise opinion costs would rival

18 MPEP, supra note 13, § 2106(IV)(C).
19 See Le Roy v. Tatham, 55 U.S. 156, 159 (1852) (declaring that, “a principle is not patentable. A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented . . . .”). For a fuller discussion of the United States transition from describing an invention by its operating principle (central claiming in the patent application) to peripheral (i.e., “metes and bounds”) claiming beginning in the 1870s, see KAHRL, supra note 15.
20 BESSEN & MEURER, supra note 7, at 241–42.
22 See Mark A. Lemley, Rational Ignorance at the Patent Office, 95 NW. U. L. REV. 1495, 1496 n.3 (2001) (“Examiners have astonishingly little time to spend on each application—on average, a total of 18 hours, including the time spent reading the application, reading the submitted prior art, searching for and reading prior art in databases accessible to the PTO, comparing that prior art to the application, writing an office action, reading and responding to the response to office action, iterating the last two steps at least once and often more times, conducting an interview with the applicant, and ensuring that the diagrams and claims are in form for allowance.”); see also BESSEN & MEURER, supra note 7, at 56 (discussing the hourly constraints).
litigation costs. Because the PTO already had ample opportunity to build a delimiting file history, and because issued patents are regularly invalidated by courts, a completely independent review by the courts is more appropriate. For a difficult case, a district court would be better advised to retain a special master.

Fortunately, there is a simpler way to plumb the PTO’s understanding of an invention’s nature or essence. The cover pages of U.S. and foreign patents list a series of classification codes that designate the specific fields of prior art that were searched when examining the application, and which can be searched by any party. The PTO’s search results are also displayed at its online public database for file histories. The U.S. patent application data sheet specifically requests suggestions from applicants as to which classifications should be searched and which group art unit should do the examination, though making such a recommendation is not mandatory. In the event that a PTO search is narrower than an applicant desires, she is free to file additional applications. These may be divisional if an examiner has issued a restriction requirement after determining that the subject matter under review would involve too many classification codes. The applicant may also file continuation or continuation-in-part applications with amended claims to obtain searches under alternate classification codes.

The examined code series are not exclusive, yet they identify the patent office’s essential understanding of the nature of the invention with at least implicit acquiescence by the applicant as to their relevance where she does not object in the record. These art categories are in fact specifically screened by some patent


26 See MPEP, supra note 13, §§ 803 (“If the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions . . . . There are two criteria for a proper requirement for restriction between patentably distinct inventions: (A) The inventions must be independent . . . or distinct as claimed . . . and (B) There must be a serious burden on the examiner if restriction is required . . . .”), 201.06 (concerning the filing of divisional applications for independent or distinct inventions carved out of a pending application).

27 Regarding continuation and continuation-in-part applications generally, see id §§ 201.07, 201.08, respectively. Regarding classification codes, an alternative code can be suggested at filing of the continuation or CIP as permitted under 37 C.F.R. § 1.76(b)(3) (2008).

28 An inventor’s view of the scope and heart of the invention is typically stated in the “field of
practitioners (myself included) when rendering legal opinions on validity, clearance, and infringement. Searches by classification are also a standard feature of commercial patent database vendors. My proposal here is for courts to consider the relatedness of classification codes between those searched by the original examiner and those in which infringement allegedly occurs. The beauty of such an analysis is that verbal interpretation is not required. The analysis merely reviews which fields PTO examiners thought were most pertinent at the time. The codes represent a valuable, objective, and neutral indicator of what scope of art is reasonably searchable for a given invention—which is also a good proxy for the degree of infringer willfulness—and they require no drastic change in current patent practice. A patentee whose enforcement of invention breadth is distant from searched art classes could lose on at least one of the following three grounds: (a) the distant art was not searched or in view by the examiner thus it was irrelevant and not at issue; (b) the wider significance of the disclosure would have been lost on a person of ordinary skill in the art that was searched, thus it was not enabled; or (c) failure to seek the relevant art search during prosecution disqualified enforcement for that utility due to prosecution laches.29

Thus, with respect to alleged infringement, fairness would require a broad interpretation of issued patent claims within the arts coded on the face of the patent, but a narrow interpretation within arts that are distant from or non-obvious over those codes. Under this approach an invention relating to point-of-sale retail hardware or processes might be considered relatively distant from online ordering algorithms, and vice versa, unless the prosecution record had specifically touched upon the potential overlap of obviousness between them. This type of analysis will defang any mindful hiding of invention utility in unusual claim terms,30 because they cannot unveil a broader scope of interpretation after the invention” and “brief description of the invention” sections, but they are less rigorously defined than PTO numerical categories. See MPEP, supra note 13, §§ 608.01(c) (field of invention), 608.01(d) (brief summary of invention).

29 See Symbol Techs., Inc. v. Lemelson Med., Educ. & Research Found., LP (Symbol IV), 422 F.3d 1378 (Fed. Cir. 2005) (resurrecting the prosecution laches doctrine, the torpedo that spelled the end of the true submarine patents).

30 BESSON & MEURER, supra note 7, at 194–201 (describing cases and the use of certain categories of claim terms as hiding the invention utility). In particular, see page 200, where they object to the use of abstract terms such as “frame” and “matching” because in some cases the progress of technology renders the claim map increasingly uncertain over time. They likewise argue that certain terms are too vague to describe software inventions, including the terms “point of sale location,” “material object,” and “information manufacturing machine” to describe a software invention as for U.S. Patent No. 4,528,643. The authors observe that, “[a]lthough clever lawyers can use vague language with any technology, abstract technologies particularly lend themselves to such abuses because they are inherently described in abstract terms.” Bessen and Meurer are also concerned that such terms can be chosen rationally such that they will receive a narrow interpretation
issue. This limiting analysis addresses the problem cited in Bessen and Meurer’s primary example of ill-advised litigation holdings.\textsuperscript{31} The solution offered here also avoids the very difficult task of refining claim interpretation rules. Curiously, though art turned up by PTO searches is often at issue in patent cases, the search scope has been overlooked in claim interpretation.\textsuperscript{32}

Many classification codes are narrow, and due to time constraints each examiner searches only a few categories even if more might be relevant.\textsuperscript{33} Thus in some respects, the aggregate scope of the codes may still be less than the utility of the invention. Also, the issued patent will pertain to all of the relevant comparable uses, even in related code fields that the examiner did not search. So the value of the codes is not as a boundary, but as a metric to gauge whether a claimed utility is far removed from the utility basis for which the invention was awarded. There is a public interest in the award and enforcement of patents for the scope of invention as reasonably disclosed to the patent office, and reasonably understood and representatively searched by the patent office. The assertion of patent claims for anything broader threatens this interest.

This branch of my plumb line addresses Bessen and Meurer’s finding that “about a quarter of all lawsuits between public firms involved firms that patented in very different technology classes and which were in unrelated industries.”\textsuperscript{34} By way of illustration of my basic classification search, consider the Freeny E-data patent cited by Bessen and Meurer as an instance of blocking on-line sales inappropriately.\textsuperscript{35} The relevant classification codes changed after being stated on the face of the patent, but are shown with updated code numbers at the PTO’s online full-text database.\textsuperscript{36} Here the updated chief class is 705/52. The title of

\cite{Bessen & Meurer, supra note 7, at 69–70 (discussing suits against Amazon by firms holding patents covering cable TV movie selection and bank ATM interface).}

\cite{Lemley, supra note 22 (“Examiners have astonishingly little time to spend on each application-on average, a total of eighteen hours . . . .”).}

\cite{Bessen & Meurer, supra note 7, at 69.}

\cite{Id. at 194 (discussing U.S. Patent No. 4,528,643 (filed Jan. 10, 1983)).}

the 705 class is “Data Processing: Financial, Business Practice, Management, or Cost/Price Determination.” Subclass 52 is part of a nested series of subordinate classes as follows: (50) “Business Processing Using Cryptography” (defined to include “the processing of financial data or where a charge for goods or services is determined”; (51) “Usage Protection of Distributed Data Files” (defined to include “usage of distributed information representing a selection by an individual . . . controlled by encryption,” with a note indicating that the method of distribution can include downloading); (52) “Usage or Charge Determination” (defined to include “determining the amount of use of the selected information or a cost associated therewith”).

A historical study of the classification categories would likely find their content was not so well defined or clearly articulated when the Freeny application was filed in 1983, which constrains the hindsight value of updated codes. But for a rational search today by art classes, the current categories give ample notice. Moreover, three other U.S. class/subclass categories currently apply to this patent, as do six international codes. So, for a code search today, there would be no question that if this patent was newly issued it is highly relevant to electronic commerce. The text may also be searched electronically, e.g., a quick e-search of the text and a review of the PDF drawings reveals the Freeny patent does not mention kiosks by that name, though Bessen and Meurer use that term in their description of its coverage.

37 PTO, Classification Definitions, available at http://www.uspto.gov/web/patents/classification/uspc705/sched705.pdf (citing subclasses of (5Z) including: (72) through (79) which cover a general electronic commerce system which includes billing; (380) which covers cryptography; and subclasses of (380) such as (231) through (234) which classify video electric signal modification using cryptography having usage or charge determination). Definitions for any class can be searched at http://www.uspto.gov/web/patents/classification (last visited Oct. 8, 2008).
41 See, e.g., the E-Data application discussed at BESSEN & MEURER, supra note 7, at 194–95. The text, but not the drawings, of the patent are readily searchable at the Patent Full-Text and Image Database, supra note 40. The reader may download free PDF images of the patent at http://www.pat2pdf.org (last visited Oct. 8, 2008) (preferred over the PTO website, which downloads only one PDF page per command). The interested reader may visually review graphics in pdf files of United States patent documents.
III. PLUMB LINE NO. 2: ALIGN SCOPE WITH INITIAL INVENTOR PERCEPTIONS

As discussed above, my proposed filters for examiner perceptions are enhanced. I would also enhance them for the applicant's perceptions. With one modest change in prosecution protocol, an applicant's understanding of the invention during original prosecution can be ascertained from the record much more objectively to limit its scope of enforcement. This concerns the applicant's disclosure and characterization of prior art, which is already a routine aspect in patent prosecution.

Applicants are not required to conduct a search of prior art, but until the application becomes abandoned, they must in candor and good faith inform the PTO of all information known to be material (i.e., unfavorable) to patentability, of which the inventor, attorney, or agent, and any other person associated with the filing and prosecution are aware. Information that is cumulative (i.e., redundant) in materiality relative to other information need not be disclosed. The art disclosures by the applicant are filed using a standard PTO form and typically include citations and hard copies (cited U.S. patent documents need no hard copies) of the art. Sources for the art include foreign office actions for the same invention, U.S. and foreign office actions for sibling applications, citations to other members of the patent family, art known to the inventor, and art found during due diligence searches. Disclosing hundreds of references or rendering biased translations is viewed as possible inequitable conduct to bury material information among less important information. Usually applicants are not required to compare or contrast this art with their own claims. But applicants requesting accelerated examination must search for prior art, identify all claimed elements found in each relevant reference, and prepare an explanation of why the claims are patentable over the references.

42 37 C.F.R. § 1.56(a) (2008); see also MPEP, supra note 13, § 2001.04 (discussing information requirements).
43 37 C.F.R. § 1.56(b) (2008); see also MPEP, supra note 13, § 2001.05 (discussing cumulative information).
44 See Form PTO/SB/08a,b (PTO-1449) (2008), available at http://www.uspto.gov/web/forms/index.html (Information Disclosure Statement by Applicant Form); see also 37 C.F.R. § 1.97 (2008) (filing of information disclosure statement); id. § 1.98 (content of information disclosure statement, including citation and hard copy requirements).
45 MPEP, supra note 13, § 2001.06.
46 See eSpeed, Inc. v. Brokertec USA, L.L.C., 480 F.3d 1129, 1136 (Fed. Cir. 2007) (pertaining to voluminous exhibits); Semiconductor Energy Lab Co. v. Samsung Electronics Co., 204 F.3d 1368, 1377 (Fed. Cir. 2000) (pertaining to a partially translated reference).
47 MPEP, supra note 13, § 708.02. Until Aug. 25, 2006 accelerated examination was available only in certain special cases, but since then it has also accommodated any applicant willing to meet
Because comments during prosecution on third-party art could be construed in subsequent litigation (aptly or not) either as a narrowing admission or unethical misrepresentation, patent practitioners are loathe to make them except in response to office actions to rebut specific grounds of rejection. Moreover practitioners will not undertake searches without specific instructions from the client. Yet requiring each utility patent applicant to timely and systematically search and discuss prior art as well as search criteria closest to their independent claim limitations would better establish the applicant’s mindful scope of relevance and create estoppel grounds. A search need not be costly or exhaustive—merely representative of scope. A foreseeable side benefit would be that an applicant’s submitted search and discussion of the closest prior art could help anticipate and avoid common rejections because the issues of knowledge, obviousness and enablement for persons of ordinary skill in the relative art would be addressed in the submitted remarks.

Frankly, patent attorneys do not need or want the extra work this proposal contemplates because they already have a full docket and a backlog. Yet the cost to applicants would not be high. Bessen and Meurer’s cited cost of $5,000 to search software art is probably an underestimate for clearance purposes and an overestimate for prior art disclosure purposes, but is a modest fraction relative to the total costs of patent drafting, prosecution and maintenance.

Applicants following best practices have little to lose from it. The specifications they file already describe inventions in considerable detail with a full menu of detailed definitions and examples. Moreover, their attorneys do not try to sneak something past examiners because unethical behavior would jeopardize their license at the PTO. See, e.g., 37 C.F.R. § 10.85(a)(2), (3) (2008) (explaining practitioner duties of good faith and disclosure). Thus, they do not rely on vagueness to capture scope.

Bessen & Meurer, supra note 7, at 213, and references cited therein.

See Lemley, supra note 22, at 1498–99 (reviewing prosecution cost estimates as ranging from $10,000 to $30,000 per patent).
To date, the primary objective in requiring applicant disclosure of material information has been to facilitate examination and prevent hiding of potentially invalidating art, but disclosure has far wider potential. Like the classification codes, such disclosures can be a safety valve to estop outrageous expansion of claim scope. For instance in the point-of-sale Freeny patent cited by Bessen and Meurer, the discussion of background art largely addressed vending machines. If the applicant had been required to search and comment on the closest (in the applicant’s mind) known relevant art, and only items pertaining to vending machines were submitted in response, it would suggest that other types of sales including (ultimately) online sales were never in view. In such a case the inventor would never have been in possession of the wider scope.

In other words, an inventor’s demarcation of an application’s circle of relevance should also impose limits on claim interpretation and on scope under the doctrine of equivalents. Designation of relevance in prior art can indicate by concrete example what written description has often failed to do. It can also prevent vague or “lucky” patentees from usurping scope beyond what was in their mental possession on the filing date. Thus, I propose that inventors should be required to list examples of nearest prior art. This is somewhat like Bessen and Meurer’s suggestion of including claim charts in the prosecution history, and coincidentally supports their objective of limiting early stage development from claiming later-stage technologies, except that in my model the claim charts would be initiated by the applicant, not the examiner. The PTO is loath to add new tedious tasks to examiner caseloads in any case.

It would further strengthen the record if examiners were required to annotate the forms for an applicant’s art submissions where the relevance was not supported by the application. Specific grounds should be cited for determinations of irrelevance, such as that the cited relevance lacks an enabling basis in the application, or the application is too ambiguous to support a finding of relevance. Currently, examiners merely initial each citation on a submitted art disclosure form and enter it into the record to confirm that the art has been reviewed for relevance to validity. Indications of irrelevance during original prosecution would have more value than ex post facto PTO findings because they would raise a red flag at a time when an applicant could be estopped by acquiescence.

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52 BESSEN & MEURER, supra note 7, at 194–95.
54 BESSEN & MEURER, supra note 7, at 240–41.
55 Id. at 243.
56 See MPEP, supra note 13, § 609 (discussing examiner initialing of information disclosure statements to indicate that references therein have been considered).
To be most effective, in a full, clear, concise and exact way (i.e., the standard for definiteness), the applicant's disclosure and characterization should explain how limitations of the independent claims are like and unlike the closest embodiments in the respective reference. The characterization should also reference page and line numbers in the specification as well as the cited art that support any interpretation of claim limitations that is not prima facie obvious from the claim terms standing in isolation. Prolix and disorganized discussion should be barred.

This requirement would have a low administrative burden. The PTO already reviews art disclosure forms routinely and values characterizations by applicants as a means for expediting examination. And, the courts already rely on the evidentiary and estoppel value of a well-developed prosecution history.

IV. PLUMB LINE NO. 3: ALIGN OBVIOUSNESS WITH MARKET PERCEPTIONS

Having identified perception gauges for examiners and inventors, let us turn to market perceptions. My third proposition is that original inventors should be on notice that an innovation may be in the public domain (i.e., through obviousness) when markets have been moving inexorably toward development of the invention. In other words, the invention is inevitable. I identify four elements that must be present in substantial measure to justify a finding of inevitability: market convergence, limited alternatives, predictable art, and common knowledge.

A. MARKET CONVERGENCE

Regarding market convergence, an extreme case is when asserted infringement claims from a single patent block many companies from strategies they planned at about the same time as the original invention. This happens in winner-take-all technology “horse races” in which the independent inventions differ in time only by days or even hours. The effect is the same as when a submarine patent emerges in an established market. Each player must decide whether to license,

60 See, e.g., Eliot Marshall, AIDS Research: HIV Experts vs. Sequencers in Patent Race, 275 SCI. 1263 (1997). Half a dozen HIV groups were vying for priority on CCR5—the receptor by which HIV enters cells early in an infection—and many filed patent applications. However, Human Genome Sciences, a genetics company not directly involved in these HIV studies—beat them to the patent office. Id.
litigate, or leave the field. The only reason so many companies could get caught in the horse race dilemma is by all pursuing the same general solution. So, a cogent review should consider whether an original inventor presciently anticipated or influenced the market direction well before all others (so the invention was not yet inevitable), or simply ran with the pack on a well-defined track and led by a nose at the finish line (i.e., invention was inevitable).

The policy rationale for a market convergence element assumes that inevitable movements by free markets need no federal patent incentives. When many companies crowd into the same market space at the same time, it suggests prices should fall naturally to commodity levels. A patent will only distort the market by enabling a price premium for an innovation in which competitors required no premium. Of course, United States courts have not expressly recognized inevitability as a basis to reject or invalidate claims, but the principle can also be stated in obviousness terms. When an entire market moves together, the frontier of obviousness to one of ordinary skill in the relevant art moves in the same direction at the same rate. The patentable scope collapses as the point of interest is neared, thus the winner of a technology race should not necessarily receive a patent. But trend analysis must not be too fatalistic, otherwise nothing would be patentable.

Crowdedness is a key concept here. A market with two players is usually not a crowd. Three is likely not a crowd. But six players could be a crowd. And twenty competitors in the same market—that would definitely be a crowd for a market environment. If they all move in a certain direction, something must be obvious.

B. PREDICTABLE ART

The second element, predictable art, affects some fields more than others. In particular, the development of software, mechanical devices, and electrical circuits has highly predictable features, mechanisms, and paradigms, though sub-field exceptions exist, and even predictable fields are not immune to gremlins such as software bugs or electrical circuit cross-talk. Conversely, even normally unpredictable fields, such as complex biotechnology, have pockets of predictability. For instance, an expectedly patentable pure natural extract may

61 Telephone Interview with Dr. Allen L. Brown, Jr., Software Architect/Senior Program Manager, Web Data Access Group, Microsoft Corp. (Nov. 2006) (indicating that effective software designs can be predicted in advance of software patents).

62 For example, flat panel antennas have complex behavior. Interviews with Dr. Oscar Garay and staff, Motorola, Inc., Radio Products Division, in Plantation, Fla. (1993–1995). In the 1990s Motorola’s Ph.D. engineers felt only empirical data could establish their exact properties. Id.
have predictable utility and predictably effective purification paths. Technical predictability can be a liability. Many companies cannot justify the expense of commercially attractive inventions unless managers anticipate reaping premium profit levels by locking out copy artists. But in uncrowded fields, even for predictable arts, such patents would be justifiable in policy.

An example of unpredictable results at the time of invention is DNA sequencing. When its first commercially viable chemistry was invented, there were probably twenty undiscovered alternative chemistries that potentially could have been used instead if someone had taken the effort to find them. Yet the first-to-market advantage would have been so significant, and the “also-ran” development and discovery effort would have been so burdensome, that it would not have been worth the effort to invent around the first discoverer of an economically viable method. And there would be no plausible argument that competitors could reach the same invention the same way or the same day, so most players would just license or move on.

Note that a benefit of the predictability element is that it allows fair and impartial discrimination according to the patent needs of industries without requiring an industry-specific rule. Yet, it does not foreclose patents altogether for creative approaches or market creation in an industry that is built on a highly predictable art. It does not penalize patentees either in less predictable art or in spaces where art is uncrowded. Rectification of software patents is a special concern to Bessen and Meurer (one of whom has run a software company). If I understand their proposals, they would not only broaden obviousness criteria, but even eliminate software patents as a class because of inherent abstractness (i.e., indefiniteness) and unknowing equivalence. So only unpredictable arts would retain substantial patent scope. My proposal merely aims to make the least amount of change that will remove the problem.

C. LIMITED ALTERNATIVES

The third element, limited alternatives, may apply to the product, the service design, the available resources, or any combination of the three. For a design
example, there are only so many ways to click through a website. Amazon’s patented one-click purchase process is an extreme example of tying up one of the seemingly few alternatives available in a field, though in that particular case the hindrance to the rest of the industry has likely been exaggerated. A more severe example of industry constraint is found in Bessen and Meurer’s discussion of the submarine-like effects from the Freeney patent. For a resource example, there are a limited number of botanical sources known to be rich in the antioxidant resveratrol. If the nutraceutical industry moves en masse to make resveratrol dietary supplements, those supplements based on ground seeds from muscadines (leathery skinned wild grapes common in the southeastern United States) should not necessarily be patentable over ground components of domestic grapes if the industry rushes toward both. In general, when technology races converge toward one or two solutions, players likely have few alternatives that can serve the desired purpose.

69 The Internet industry was particularly irate over the one-click patent, which seemed to epitomize their grievances about business method patents in general. See, e.g., Matthew G. Wells, Internet Business Method Patent Policy, 87 VA. L. REV. 729 (2001). The vaunted advantage was that the Amazon customer does not need to re-enter data for shipping and orders. But on reflection, the patent probably did not inconvenience competitors much. For instance, on a physical level it is not difficult to click twice instead of once, and who counts clicks anyhow? Moreover, Amazon asserted its patent publicly only against Barnes and Noble, with whom it ultimately settled. See Troy Wolverton, Amazon, Barnes&Noble settle patent suit, CNET NEWS, Mar. 6, 2002, http://news.com.com/2100-1017-854105.html (reporting settlement). Currently the patent’s validity is uncertain, because it is under reexamination due to a third-party request. U.S. Patent App. No. 90/007,946 (filed Feb. 16, 2006). However, it seems likely that the real value of the patent was less in excluding competitors or obtaining licensing fees, than in creating a trademark-like advantage. For instance one Amazon webpage uses the term “1-Click” no less than 14 times in a section with 101 words. Amazon, Ordering via 1-Click, http://www.amazon.com/gp/help/customer/display.html?nodeId=468480 (last visited Oct. 7, 2008). From that marketing-based perspective, we might surmise that the controversy over the single click only played into Amazon’s hands by providing free publicity and enhancing recognition of its brand name among consumers.

70 BESSEN & MEURER, supra note 7, at 194.
71 RESVERATROL IN HEALTH AND DISEASE (Bharat B. Aggarwal & Shishir Shishodia eds., 2006). Resveratrol (3,5,4'-trihydroxystilbene), also called sirtuin, is a polyphenolic phytoalexin that has antioxidant properties and is produced naturally in several fruits and vegetables including grapes, peanuts, cranberries, blueberries, mulberries, and jackfruit. Id. Not all sources are concentrated: grape skins, muscadines and Japanese knotweed are among the most concentrated sources of it. Id. Resveratrol was first described by Ayurvedic medicine 5,000 years ago as a cardiotoxic. Today the compound is known to provide a number of health benefits, including for instance anti-tumor, cardiovascular, antibiotic and metabolic indications. Also, anti-aging benefits have been reported for small animals that ingest resveratrol. Id.
D. COMMON KNOWLEDGE

The final element, common knowledge, almost needs no explanation. If market participants did not have common knowledge of the market opportunities, available resources, design alternatives, and predictability of the technology, they could hardly arrive at near-identical inventions or discoveries in a parallel manner.

The inevitability criterion needs to be applied with caution because hindsight is so much better than foresight, but one benefit of this four-element analysis is its nuanced screening for non-obviousness. For example, both inevitable and non-obvious inventions may have evidence of commercial success and unsolved needs of the marketplace. But the combined four elements of inevitability introduced here can distinguish inventions that were truly non-obvious from those that were not. Essentially, the inevitability criterion fills gaps in jurisprudence identified five times by KSR as merely the need for "common sense" when identifying obviousness. 72

Although KSR took a step in the right direction by contemplating market forces and design needs, the Court did not provide enough analytical structure to educate a judge who has no formal business training, industry experience, or invention background. 73 Perhaps intuitively the Court recognized that a key analytical element had yet to be articulated: KSR stopped short of formulating an all-encompassing test, merely stating that the nature of the problem to be solved should be considered. 74 Thus, the Federal Circuit’s motivation analysis, though not jettisoned, was relegated to a mere subset for obviousness, and room was left for review of the nature of the problem the inventor was trying to solve.

Inclusion of the four-element inevitability test in the Federal Circuit’s superceded test would make it coextensive with the KSR analysis. The four-element test codifies the information needed to analyze the problem, solution, and motivations. What could be more relevant to these than commercial objectives, the competitive environment, available resources, design limitations, the relative probability of achieving an invention goal, and the prior art? This is just "common" sense from an industry perspective. 75

In discussing inevitability, some perspective is in order because the potential damage is often vastly overestimated, as the following account illustrates. In the 1990s, I did development work for lithium ion flat cell batteries intended to be safe, flexible, mostly polymeric, and paper-thin. Early patent claims from all

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72 KSR, 127 S. Ct. at 1741–43.
73 Id. at 1740.
74 Id. at 1734.
75 Note that a consequence of both KSR and the inevitability model is express consideration of the business context of the person of ordinary skill in the art.
players were broad, pioneering, and sometimes utterly implausible. Only electrode materials and metal current collectors seemed to have much maturity in patented advancements. Much of the relevant electrochemistry and materials science was a so-called "black box" because it was surprisingly complex and had not been studied in depth. While there were less than a dozen serious competitors, most early patents ultimately proved to be useless because the inventions were inchoate, and nobody could predict what would be operationally or commercially most viable. Yet within five years lithium ion cells became an extremely hot field, and dozens of serious competitors emerged. Allowable claims kept narrowing for all the battery components because everyone crowded toward variants on the same handful of solutions. It was the same story for anodes, cathodes, separators, current collectors, electrical leads, solvents, salts, stabilizers, cell design, safety circuits, packaging, charging protocols, test modules, and manufacturing processes.

Also, the entire art became much more predictable because academic labs tackled the basic science and published their results. Their federal research funding chased the fields that were commercially hot. Corporate researchers monitored that literature as well as patented developments of competitors. Now many of those inventions are in the public domain because the patents expired or were allowed to lapse, and patents issued today in that field are even narrower or seldom breakthroughs. 76

Since then, I have seen the same patterns repeated for internet patents, pharmaceutical patents in specific sub-fields, and other arts. The battery example covered a period of several years and relatively unpredictable art. No patent foreclosed all uses of the only viable approach to the technology, and probably none ever could.

76 For an example of the narrowness of the recent patents in this area, see, for example, U.S. Patent No. 7,306,880 (filed Nov. 18, 2003) which was issued December 11, 2007 to Noh. The assignee is Samsung SDI Co., Ltd (Korea). The patent claims a non-aqueous electrolyte (i.e., liquid for a lithium ion battery) including twenty to ninety-five volume percent of an ester-based or ether-based organic solvent, one or more lithium salts, and an additive having at least two carbonate groups. The stated benefits include increasing the boiling point of the solvent and providing better passivation (i.e., improved stability of the liquid at the electrode surface). Based on my prior experience in the field, I would estimate that there are several thousand United States patents on comparable variants of solvent mixtures for lithium ion batteries. Most of these patents also recite the use of ethers, esters and or carbonates. Most also recite use of members of the same circle of lithium salts (developing and manufacturing viable new salts is more difficult than devising new solvent mixtures), though I conceived and co-invented a patented novel lithium salt. See U.S. Patent No. 5,597,663 (filed May 30, 1995). And most also recite an improvement in the stability of the solvent mixture. Thus, given the amount of prior art, newer patents necessarily claim a narrower range of electrolyte recipes or recite more limitations.
Predictable arts are different: the race is faster there. During my tenure at Motorola, because of the increasing predictability and cost savings for electronics and computer chips, the pace of competition routinely took new telephone inventions from high-end lifestyle or early-adopter products to mundane commodities within just three years of entering the market. Additionally, Atlanta area software developers tell me their offerings would fall off the market map in just two years if they stopped innovating.

The reason competition escalates into a race is because all competitors are adding the same features to their products. So in addition to speed, the predictable arts seem to have fewer and less creative alternatives for economic viability than the unpredictable arts enjoy. As a result, key gridlock or bottleneck problems arise not because of patent proliferation but because a patent emerges in a "gateway" to new technology horizons, and this has been at issue not just in the "dry tech" universe but also in predictable biotech. So I submit that patent reform need not be sweeping; it just needs to ensure that any enforced gateway patents are not for inventions that were inevitable at the time, and that their claim interpretation conforms to the invention as manifestly understood by the examiner and applicant during prosecution. Hence, I have introduced merely three plumb lines for calibrating patent scope from various angles.

V. TESTING ECONOMIC ASSUMPTIONS

The question now is whether these three plumb lines go far enough. *Patent Failure* musters a prodigious amount of economic data to support its startling

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77 See generally, Maureen O'Rourke, Toward a Doctrine of Fair Use in Patent Law, 100 COLUM. L. REV. 1177, 1179 (2000) (characterizing a patent anti-commons as one in which "rights are held by so many different patentees that the costs for anyone to accumulate all the required licenses to enable production [are prohibitive]"). Regarding bioscience patent anti-commons, see Michael A. Heller & Rebecca S. Eisenberg, Can Patents Deter Innovation? The Anticommons in Biomedical Research, 280 SCI. 698 (1998) (concerning in part the effect of patenting research tools). But such bottlenecks seem to be rarer than is often assumed, as observed for licenses on diagnostic methods by the director of the technology transfer office for the federal National Human Genome Research Institute (NHGRI). See Claire Driscoll, Federal Sector Role, NATIONAL INSTITUTES OF HEALTH (NIH) SECRETARY'S ADVISORY COMMITTEE ON GENETICS, HEALTH, AND SOCIETY (SACGHS) MEETING TRANSCRIPT (Mar. 26–27, 2007), available at http://www4.od.nih.gov/oba/SACGHS/meetings/Mar2007/transcripts/Driscoll-GenePatents.pdf ("In my 10 or 15 years of doing this, I hear the same five examples or six examples repeated over and over. We can all name them by heart: BRCA1 and 2, Myriad Genetics, hemochromatosis; Canavan's disease. It's the same ones."). A false perception of gridlock may also be caused by transactional costs and inefficiencies arising from the lack of available rational pricing schemes for patents. See F. Russell Denton, Rolling Equilibriums at the Pre-Commons Frontier: Identifying Patently Efficient Royalties for Complex Products, 13 VA. J. L. & TECH. (forthcoming Fall 2008), available at http://works.bepress.com/f_russell_denton (introducing the concept of a pseudo-anticommons and explaining its pricing basis).
conclusions and advocacy for a much broader sweep of patent reform than I propose. The reforms of Bessen and Meurer would impose substantial social costs in the form of implementation logistics and altered commercial expectations, but might be justified if their conclusions are correct. Thus in this part, I test some of the book’s key economic assumptions to assess whether the data supports the interpretations that Bessen and Meurer assert.

I begin with their study of a patent “flood” starting in the early 1980s in which filing rates outstripped the rate of United States research and development (R&D) spending. Those spending observations imply that applicants are abandoning value-adding research and increasingly filing without merit. My review of PTO statistics suggests the analysis was too limited. United States patents from foreign origins accounted for approximately sixty percent of that growth during the same period, consistent with the trend toward globalization. Moreover, one would not expect those patents to be the result of United States R&D spending. Another three percent or so of the overall patent growth rate was from university patents that were first authorized for federally subsidized inventions by the Bayh-Dole Act of 1980. The remaining growth corresponds to an average increase of roughly 3.5% per year for United States-origin filings. This amount of growth per year is not a flood, and is almost exactly the same as average annual growth rates for United States R&D investment in recent decades. That is not a crisis.

Bessen and Meurer also suggest that proliferation of patent litigation hurts investment in technology. Yet their annual figures for both the number of new patent applications and the number of patent suits filed in district court slightly more than tripled between about 1980 and 2004. This suggests that on a per-patent basis there is no more confusion, litigiousness, or reluctance to invest in

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78 BESSEN & MEURER, supra note 7, at 235–53.
79 Id. at 63 fig.3.2, 68-69.
84 BESSEN & MEURER, supra note 7, at 121 fig.6.1.
85 Id. at 68–69.
86 Id. at 121 fig.6.1.
technology now than thirty years ago. Perhaps today patents are litigated sooner rather than later. The authors note that the per-patent litigation rate within four years of issue has doubled. Yet only 1.5% of United States patents are litigated, and in a recent year barely one hundred (less than four percent of patent cases filed) actually reached trial. Again, evidence for a crisis is thin.

Bessen and Meurer also fear that growth in the number of patents and claims—especially in software—creates difficulty in adequate clearance searches. That is possible, particularly given their concerns about abstract language that is difficult to search. Even so, other factors support an alternative interpretation. The software industry has grown at an enormous rate. For instance, during the 1990s the packaged software industry grew on average twelve percent per year, came to represent one percent of the United States gross domestic product, and has been one of the biggest drivers of United States economic growth overall. Those numbers mean that in a single decade the industry almost quadrupled in size, so one would expect corresponding proliferation of prior art that must be searched. Moreover, the 1990s witnessed a mushrooming of United States technical disclosure across the board, in my own observations, hundreds if not thousands of new technical journals were launched, and the annual number of articles submitted for publication continues to escalate, also adding to a searcher's burden. Yet, due diligence has become easier because of advances in search technology, online bandwidth, a growth industry in database searches (even Lexis conducts clearance searches), and the appearance of free searchable PTO online databases, not to mention other public online databases. Independent inventors today do their own searches and are better informed of prior art than their predecessors ten years ago.

Infringement actions today are possibly more disruptive to industries than they were before the most recent run-up in patent numbers. However my search turned up no evidence for this proposition. Bessen and Meurer's own pair of

87 Id. at 129 fig.6.3.
90 BESSEN & MEURER, supra note 7, at 69–77.
91 See id. at 8–11, 56–68 (discussing the difficulty of searching or recognizing the significance of claims that employ abstract language).
cited case studies on gridlock pertain to patents that are both expired; each case involved effects on a new industry that has continued to thrive, and only one actually affected numerous companies. Admittedly, disruptions such as the more recent BlackBerry patent litigation occasionally appear in a pioneering field, but they are not the norm. This seems to merely confirm that the few critical “surprise” patents that cause gridlocks or patent thicket phenomena are transient—but after all, patents are exclusive rights—and that nascent industries where such patents are asserted are nevertheless robust. There is reason for optimism: Mature industries with complex products develop efficient licensing structures such as for pricing (as for pharmaceuticals) and for licensing mechanism (as for semiconductors).

Bessen and Meurer also discuss findings that today patents are not worth the cost of their litigation. However, they advance no evidence that the routine costs of litigation for patents are worse than for other types of business lawsuits, nor do they present information from business decision makers on patent valuation. Curiously they seem to assume that, as a group, patent holders are either irrational economic actors or cannot calculate risk-reward ratios for patenting and litigation. That seems inconsistent with traits of business people. A report from a major accounting firm throws a different light: Only about 1.5% of patents are litigated; damage awards, when adjusted for inflation, have remained fairly constant since 1995; and in recent years patent plaintiff win rates

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95 The total present value of up-front payments, research support, progress payments, and royalties in pharmaceutical patent licensing deals is about a 50:50 split of expected profits discounted by statistical failure rates for remaining R&D. F. Russell Denton, Untitled (2008) (unpublished research, on file with author).


97 BESSEN & MEURER, supra note 7, at 95–146.

98 See, e.g., discussion at BESSEN & MEURER, supra note 7, at 99 (explaining that they chose not to use the common research technique of surveying patent owners about patent pricing, and stating that observing the behavior of patent owners and investors may be a superior way to determine what those persons really think about patents).

99 Though historically patent valuation has been challenging. See Denton & Heald, supra note 96.
have fared as well as ever. Seemingly, patents provide a value basis that has been overlooked by assumptions in the cited economic studies. My conclusions about value are also more optimistic than Bessen and Meurer's ambivalence about the importance of patents as a commercialization incentive, which they gauge by events during the Industrial Revolution. Rather than reach back to the remote Industrial Revolution and its murky causes, it would have been far more direct to assess the incentive value of patents in contemporary university patent procurement and licensing under the Bayh-Dole Act. The evidence from our national experience in university technology transfer clearly indicates that United States patents are in fact enormously and unambiguously important as a factor in commercialization.
In sum, my tests of the economic assumptions of *Patent Failure* find systematic blind spots, and the book’s diagnosed economic crisis could not be substantiated as such. But even without an economic crisis, fairness to parties and the public conceivably could justify sweeping patent reforms. Hence I now evaluate Bessen and Meurer’s assumptions about justice for the parties.

VI. TESTING JURISPRUDENTIAL ASSUMPTIONS

As noted at the outset of this Article, the book’s primary legal theory—that patents do not qualify as property if their boundary lines are inherently ambiguous—is inconsistent with United States property jurisprudence because several long-respected types of tangible property also suffer from ambiguity of ownership scope. I also noted that considering only the needs of inadvertent infringers is an imbalanced approach to justice.

But, additional themes in the book merit consideration such as the efficacy of notice and the bad intent of patent applicants in verbally delimiting their inventions. As to these, *Patent Failure* compares patent practice to land surveyors simply ascertaining boundaries.\(^\text{104}\) In that light any patent claim abstraction is mere entrapment for trespass, a linguistic ruse by “clever lawyers.”\(^\text{105}\) Yet as noted above, an applicant’s alternative to abstraction is a tedious and expensive amount of concrete, specific description, or a proliferation of filings.\(^\text{106}\) And that is just to protect what others had often never conceived before anyway. Such a detailed regimen would unduly burden the PTO and the courts, so abstract definitions are economically efficient. Furthermore, claims must already satisfy favor of the contractors who invented them) had a commercialization rate in the range of eighteen to twenty percent. \(\text{Id. at 17.} \) Note that even though the Bayh-Dole Act was in place about the same time as the formation of the patent-friendly Federal Circuit, \(\text{id. at 23,} \) the incentive effect of private ownership had already been long observed in federal contracting. Arguably, this prior observation of commercial incentives provides an empirical control for assessing the effect of changes in the judiciary. By 1998, university patents had reached three percent of all those issued in the United States (i.e., just under 2,500 university patents were issued under Bayh-Dole in 1998). \(\text{Id. at 23–24.} \) And at the end of fiscal year 1996, the university sector reported 10,487 active licenses or options, representing $365,200,000 annual income, with a license growth rate of 12.9% over the previous year and an income growth rate of 22.1% over the previous year. \(\text{Id. at 25.} \) Doing the math (i.e., \(10,487/2,500\)) shows that for every new patent issuing, the universities had four existing contracts on their prior-issued portfolio. This suggests that patents did indeed provide a powerful incentive not only for the academic licensors, but also for their commercial licensees. That is a stark contrast to the earlier reticence of commercial parties to license federally funded university inventions.

\(^\text{104}\) Bessen & Meurer, supra note 7, at 54–55.
\(^\text{105}\) Id. at 200.
\(^\text{106}\) See supra note 16 and accompanying text.
requirements for expression in full, clear, concise, and exact terms, particularly pointing out and distinctly claiming the invention.\textsuperscript{107} Thus, in faulting claim interpretation principles for allowing abstract terms and inventor linguistic discretion,\textsuperscript{108} the book imposes much higher standards for drafting and interpretation than have ever prevailed even for contracts or statutes. This seems to be fundamentally out of step with United States jurisprudence.\textsuperscript{109}


\textsuperscript{108} BESSEN & MEURER, supra note 7, at 237–39.

\textsuperscript{109} Law in general does not enjoy the quality of clarity that Bessen and Meurer advocate for patents. Ambiguity in real property was discussed at the outset of this Article. As to contracts, see U.C.C. § 2-204(3) (formation of a contract) (2003); RESTATEMENT (SECOND) OF CONTRACTS § 33(2) (1981) (certainty of contract terms). These emphasize that a contract should be treated as reasonably certain if the language of agreement, interpreted in context and in light of applicable legal rules, provides enough content to establish an intent to contract, a basis for finding breach, and a means of providing a remedy. It is an analysis of formation by the parties: there definiteness and remedy are not only related to each other, but understood in terms of the relationship between the parties. So contractual definiteness is neither required nor expected by courts to be absolute. The patent-related reasoning of Bessen and Meurer takes the opposite approach, essentially suggesting that the frequency of uncertainty by third parties means that the entire patent system has failed. BESSEN & MEURER, supra note 7, at 46–47, 54–62. If we applied that same reasoning to contracts, we would not only cancel contracts (e.g., patent licenses) that suffer from too much uncertainty in the eyes of affected third parties. We would—under Bessen and Meurer’s logic—declare that contracts as a class do not work “as contracts” because the terms of performance and remuneration are so frequently litigated. And thus, we would demand reinvention of the entire corresponding legal infrastructure. The common law is more pragmatic than that and has instead honed rules of interpretation and construction, provided gap fillers, recognized terms implied in law, and so forth. See generally RICHARD A. LORD, 11 WILLISTON ON CONTRACTS §§ 30–32 (4th ed. 2008) (concerning judicial handling of indefiniteness in contracts). This common law experience in deciding uncertain contract cases hints that patent reform could be accomplished sufficiently and effectively merely by refining judicial claim interpretation and construction. Regarding statutory interpretation, the same concerns apply, and in fact, the textual canons are used similarly for judicial review of contracts and statutes. For instance, both contractual and statutory interpretation employ the principle of \textit{ejusdem generis} (meaning, of the same kinds, class or nature), such that when a list of two or more specific descriptors are followed by more general descriptors, the otherwise wide meaning of the general descriptors must be restricted to the same class, if any, of the specific words that precede them. See, e.g., 1A NORMAN J. SINGER, SUTHERLAND STATUTORY CONSTRUCTION (6th ed. 2000) (principles of statutory interpretation). The use of textual canons in any field of law is not necessarily an easy task: A rational opposite exists for each of the textual canons. See Karl N. Llewellyn, Remarks on the Theory of Appellate Decision and the Rules of Cannons About How Statutes are to be Construed, 3 VAND. L. REV. 395 (1950), republished with permission at 5 GREEN BAG 297 (2002) (arguing that every canon had a “counter-canon” that would lead to the opposite interpretation of the statute). Yet the law does not despair over choices involving canon mirror images, or over the frequency of public confusion concerning statutory meaning. Rather than condemnation on the grounds that statutes do not work “as statutes,” the law has cultivated canons that salvage statutes to the extent feasible. The extent to which American jurisprudence has coexisted with uncertainty and unpredictability is further revealed in the twentieth century formation and wide influence of the legal realism...
Though Bessen and Meurer acknowledge that technical complexity is partly responsible for difficulty in ascertaining patent scope, they apply their surveying metaphor too literally. Patent practice is to surveying what major surgery is to plumbing. A surveyor has two years of college training, and after twenty years on the job earns $26.89 per hour ($70,000 per year). Boundaries differ but land is land. By contrast, every invention brings a new learning curve and strategic business issues. Patent attorneys have technical specializations, a specialty bar exam, a unique supplemental ethical code, and over three times as much professional training as a surveyor (or even eight times including advanced degrees, fellowships, and clerkships). This exceeds the credentials of most law or science professors. In addition to their more substantial training, patent attorneys also earn more money. For example, junior patent partners bill out over $1 million per year. This comparison suggests most difficulties with notice of scope may concern expertise, not legalistic gamesmanship.

Still, it could be that many smart-but unethical-people gravitate to patent law because inventors will pay them well to hide the scope of inventions. If so, one might expect a substantial instance of judicial findings of inequitable conduct among patentees. By contrast, over a fifteen year period, the Federal Circuit held only forty or so times that there had been inequitable conduct, representing less than one percent of all appealed patent cases.

Or, hypothetically, patent attorneys might be lawfully gaming the system. For instance, Bessen and Meurer aver that patent examination is stacked in favor of movement, which argued that the unpredictability of adjudication was evidence that rules were not the actual basis of law. See generally Michael Steven Green, Legal Realism as Theory of Law, 46 WM. & MARY L. REV. 1915 (2005) (distinguishing between theories of law and theories of adjudication). The present paper does not advocate legal realism, nor does it condone sloppy drafting in contracts, statutes, or property descriptions. Nevertheless, Bessen and Meurer’s largely unforgiving standards for certainty in patents appear to be fundamentally at odds with the historic American recognition that a substantial amount of uncertainty is inevitable in every field of jurisprudence. In fact, legal clients depend on the variability of outcomes, because without it the relative skill of their lawyers would play no role at all in determining which side wins at litigation.

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110 BESSEN & MEURER, supra note 7, at 55–56.


inventors. However, the first office action in a case generally rejects claims—often all claims—and only half of applications eventually issue as patents. The book also alleges that Federal Circuit reversal of claim construction is excessive in ignoring expert testimony from trials. But those experts are just hired guns, and trial judges openly admit to being stymied by technologies and complex, unfamiliar patent law.

Bessen and Meurer also distrust continuation applications (CONs) as devices that may hide claims to be added in the future. Yet, if hiding is the intent, CONs are poor covers. Every first-year patent associate is told—that novel, unclaimed subject matter in a pending application may be claimed in amendments and continuations. Most CONs are published electronically while pending, so the full text is freely and easily searchable by routines that screen the entire PTO database at once. At least in my experience, both law firms and in-house lawyers scan the full text databases routinely (or pay a vendor such as Lexis to do it) when preparing opinion letters for clearance (i.e., to confirm that a product about to enter the market will not infringe a third party patent) and for validity searches. The full text of any published U.S. patent application, including a CON, is searchable, and in fact, pending applications are commonly flagged by search criteria. With the

114 Bessen & Meurer, supra note 7, at 56.
115 See U.S. PAT. & TRADEMARK OFF., PERFORMANCE AND ACCOUNTABILITY REPORT FISCAL YEAR 2007 tbl.2, 113 tbl.6 (2007), available at http://www.uspto.gov/web/offices/com/annual/2007annualreport.pdf (indicating the length of prosecution time is three or more years). See also Cecil D. Quillen, Jr. & Ogden H. Webster, Continuing Patent Applications and Performance of The U.S. Patent Office, 11 FED. CIR. B.J. 1, 1–21 (2001) (comparing deduced numbers of continuation applications to infer that issued claims are eventually obtained by continuation applications for most abandoned original applications; yet, not reflecting the fact that many original applications have a large plurality of issued continuation patents, while many others receive none); Mark A. Lemley & Bhaven N. Sampat, Is the Patent Office a Rubber Stamp, 23, 34 (Stanford Pub. Law, Working Paper No. 999098, 2007), available at http://ssrn.com/abstract=999098 [hereinafter Lemley & Sampat] (reporting that three-fourths of original applications result in at least one patent, but about forty percent of issued cases have narrowed claims).
116 See e.g., Bessen & Meurer, supra note 7, at 55, 58-61.
118 Bessen & Meurer, supra note 7, at 62–63.
119 See, e.g., MPEP, supra note 13, §§ 608 (disclosure), 2163.05 (changes to the scope of claims).
information from the patent document, the prosecution status and history are then routinely checked for any particularly relevant prior art using the PTO’s public PAIR database.\textsuperscript{121}

CONs are much more mundane than their portrayal by Bessen and Meurer. Notably, half of what are generically called CONs are divisional carve-outs forced on applicants by examiners to narrow searches.\textsuperscript{122} About another twenty percent are requests for continuing examination.\textsuperscript{123} These extend prosecution without broadening claims. Furthermore, if a CON hid claims, a defense of prosecution laches would be available where unreasonable delay prejudiced the infringer’s rights.\textsuperscript{124} Ironically, my experience in practice is that CONs are most widely used in chemical and pharmaceutical cases, patents the book criticizes least.\textsuperscript{125} CONs provide alternatives to examiner restriction classes, buy time to run clinical trials, are a thrifty alternative to filing many parallel applications (which is prohibitively expensive for new bioscience ventures), and have other common non-hiding uses.

Bessen and Meurer also distrust unpublished applications.\textsuperscript{126} Intuitively, these might merit more concern than CON status. Regrettably, published PTO statistics do not sort applications by publication status or basis for non-publication.\textsuperscript{127} Yet, insidious litigation trends by patentees who had kept filings unpublished could readily be identified because prosecution histories are public

\textsuperscript{121} Accessible at http://portal.uspto.gov/external/portal/pair (last visited Oct. 8, 2008).

\textsuperscript{122} See Lemley & Sampat, supra note 115, at 37 tbl.19.

\textsuperscript{123} See id. at 36 tbl.18.

\textsuperscript{124} See Symbol Tech., Inc. v. Lemelson Med., Educ. & Research Found. LP (\textit{Symbol IV}), 422 F.3d 1378 (Fed. Cir. 2005) (holding that the finding of prosecution laches was not an abuse of discretion where a patentee’s competitors sought declaration that patents were invalid, unenforceable, and not infringed).

\textsuperscript{125} Lemley & Sampat, supra note 115, at 36 tbl.18, 39 (noting that empirically observed CON uses vary by industry).


\textsuperscript{127} Lemley & Sampat, supra note 115, at 11, 33 n.49 (alluding to their own deduction of trends for unpublished applications from other data, and noting that opt-out from publication is non-randomly distributed across applications). Their cited Appendix B reporting trends in opting out of publication is . . . unpublished. Id.
after issuance. An infringement defense of prosecution laches could apply here, too, and I have noticed no published data correlating litigiousness with prior non-publication status. So in assuming that contemporary unpublished applications are merely a new incarnation of submarines, the book seems to rely on an untested hypothesis.

In light of Bessen and Meurer’s discussion of hold-ups over the Freeny E-Data patent, market gridlock might be cited as evidence of abuse by hidden patents. Gridlock concerns have also arisen concerning patent thickets, especially in biotech products. But gridlock can have other sources. Microsoft executives have told me that third parties representing thousands of narrow patents, many of dubious applicability or quality, seek royalties that in the aggregate could exceed all anticipated revenues from their products, but the company could find no financial science addressing the problem. This bogs down licensing. I show elsewhere that in fact financial quandaries over royalty sums or splits explain much of gridlock, and I show how to compute and partition royalties to overcome the problem. Hence, pricing dilemmas should not be confused with patent failures.

VII. CONCLUSION

I proposed three new metrics as plumb lines to realign the public notice of a patent’s scope objectively with a clarified and reasonably ascertainable scope of how the examiner and inventor manifestly viewed it during prosecution, and with the market’s reasonably ascertainable perception of non-obviousness at the time of the filing. In order to minimize social costs of implementation, this model attempted to identify the smallest and most neutral legal changes that could rectify the root causes of the notice problem while leaving other aspects of patent law unaltered. I believe the solution addresses Bessen and Meurer’s primary complaint in a nuanced way.

I attempted to assess whether more extensive triage is warranted in light of the data and observations set forth by those authors to justify their astonishing

128 BESSEN & MEURER, supra note 7, at 194.
129 Id. at 1–2, 182–83.
130 See, e.g., Heller & Eisenberg, supra note 77, at 698–701 (contending that the increase in intellectual property rights in biomedical research may lead to a reduction in useful products).
131 Telephone interview with Matt Gordon, Director of IP Acquisitions, Microsoft Corp.; Yonghai Choi, IP Acquisitions & Investments Manager, Microsoft Corp.; and Dr. Allen L. Brown, Jr., Software Architect/Senior Program Manager, Web Data Access Group, Microsoft Corp. (Nov. 2006).
132 Denton, supra note 77.
reform proposals. Although my present analysis is quite limited, I find their diagnosis of a patent-based economic crisis is troubled by systematically flawed assumptions. When viewed in what I suggest is a proper context, the economic data indicates the patent system largely works as historically intended, or at least has held steady in its operating efficiency. Alternatively, I assessed whether principles of fairness and equity alone would justify a broader slate of reform than my three plumb lines. Here, I find that *Patent Failure*'s diagnosis of unfairness to inadvertent infringers relies on jurisprudential ideals for clarity, transparency, and interpretation that have been historically unattainable not only in United States patent law but in much broader fields of United States law generally. Nevertheless, I can agree that there is still room for practical improvement in clarifying patent scope.

Thus, I conclude that ongoing notice problems cited in *Patent Failure* require only recalibration with unobtrusive plumb lines, not downsizing of patent rights with the book’s wrecking ball model. Notice, after all, is about line-drawing. And errors in making lines plumb are easier to fix than demolition mistakes.

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133 *Bessen & Meurer, supra* note 7, at 234–53.